

November 1963

Agriculture

Vol. 11 No. 11

SELECTED CONTENTS

<i>Marketing Boards—A general appraisal.</i>	George Houston
<i>Sheep under Cover</i>	E. S. Carter
<i>Disease-free Pigs</i>	R. P. Charlesworth
<i>Beef on the Hook—Competition Judging</i>	N. T. M. Yeates
<i>Getting the Carrot Crop through the Winter</i>	K. V. Cramp
<i>Cheddar Strawberries</i>	A. A. Tompsett
<i>Breeding from Ewe Lambs</i>	R. B. Mair
<i>Pioneers of Modern British Farming: Lord Iveagh</i>	Arthur Mitchell
<i>Replanned Buildings for the Suckling Herd</i>	L. J. Williams

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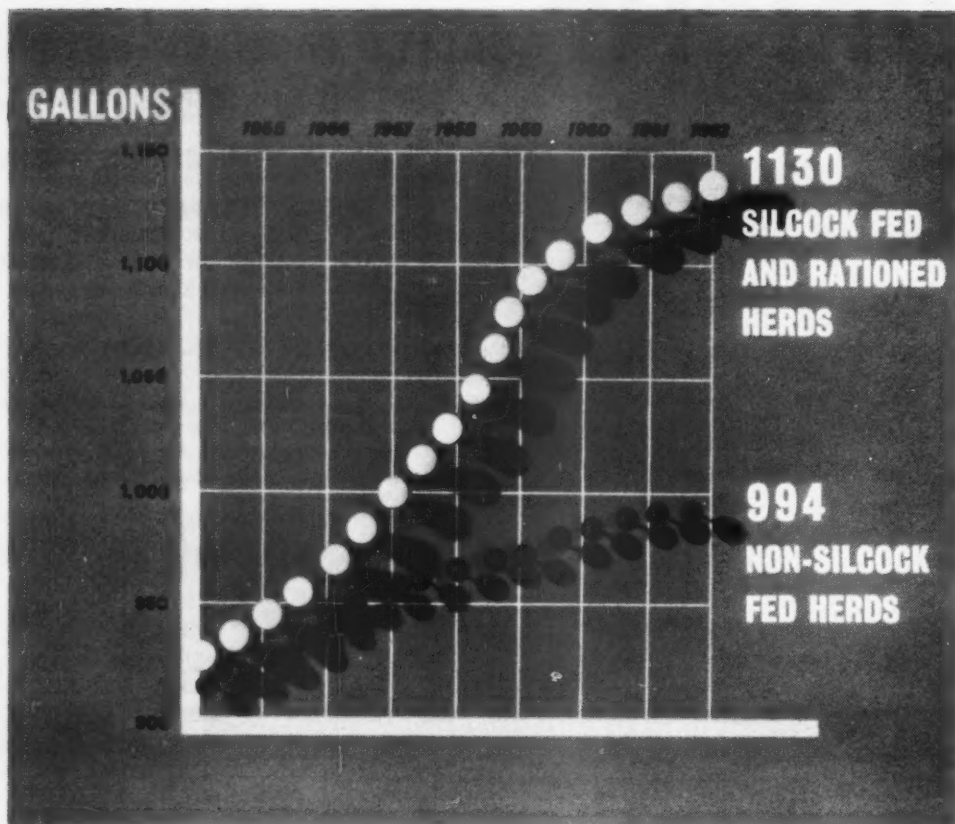
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Agriculture

VOLUME 70 • NUMBER 11 • NOVEMBER 1963

Editorial Offices

Ministry of Agriculture, Fisheries and Food
Whitehall Place, London S.W.1. Trafalgar 7711

CONTENTS

All Systems Go!	507
Marketing Boards—A general appraisal <i>George Houston</i>	508
Sheep under Cover <i>E. S. Carter</i>	512
Disease-free Pigs <i>R. P. Charlesworth</i>	516
Beef on the Hook—Competition Judging <i>N. T. M. Yeates</i>	520
Research Spot—The A.R.C. reports	523
Getting the Carrot Crop through the Winter <i>K. V. Cramp</i>	525
Cheddar Strawberries <i>A. A. Tompsett</i>	527
Breeding from Ewe Lambs <i>R. B. Mair</i>	531
Pioneers of Modern British Farming: Lord Iveagh <i>Arthur Mitchell</i>	535
Ministry's Publications	539
Replanned Buildings for the Suckling Herd <i>L. J. Williams</i>	540
Farming Cameo Series 3: 10. North Cornwall <i>L. R. Gurnett</i>	543
Agricultural Chemicals Approval Scheme	545
Your Fixed Equipment: Low-cost Boxes for Fattening Pigs <i>W. F. Hobbs</i>	546
In Brief	548
Book Reviews	551

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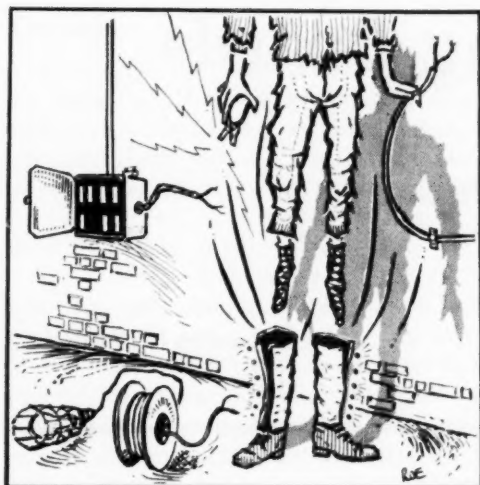
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All Systems GO!

No, this isn't our first effort in the space age. The character you see at point of blast-off isn't the second stage of our first-ever rocket. He's just a common example of the common man armed with pliers and a supreme confidence in his blissful ignorance of electricity.

But we didn't set out to be amusing. We want to warn against the awful danger of tampering with electrical wiring, for this is one field of do-it-yourself which is far too dangerous for the amateur or the improperly trained.

Most of us at one time or another have the urge to put in a bit of wiring, fix a plug (a 'socket-outlet' really, but what's in a name?) or install an extra light. And oddly enough it's all too easy to get away with it, which boosts our ego so that we go on tempting fate in a manner alarming to the electrical engineer.

Two actual examples illustrate how foolhardy it is to tamper with electrical installations. In one instance some wooden buildings were festooned with wiring hanging loosely from the beams. Junction boxes were so full of wires that they were no longer fixed but dangled in the air. The sight evoked horrible images of the possible consequences—fire, injury, death.

Even more frightening was the case where some bright amateur in gay abandon had screwed a tin lid to a junction box to replace a broken cover!

A jingle of boyhood days seems apt:

*Boy, pliers, electric wires,
Blue flashes, boy ashes.*

MORAL: Leave electricity to the qualified electrician.

Marketing Boards

A general appraisal

George Houston

MARKETING boards are notoriously dissimilar in their powers and functions. Even a casual reading of the farming press shows how varied (and fierce) the controversies can become on issues of immediate policy. In this article I shall not discuss board decisions on such pressing matters as regional pricing, Grade X milk, early potatoes or second quality eggs; the aim will be to project a short, reasoned argument for the boards to pursue a general line of policy and play a particular institutional role in our economy, which is slightly but significantly different from what is normally expected of them.

One common aim

I believe all the boards should share one common and primary aim, which can be summed up as the elimination of unnecessary short-term price fluctuations and the avoidance of long-run imbalance in commodity markets, so as to achieve mutual advantages for producers and consumers from the economic development and technical progress of agriculture.

If that sounds too like the preamble to an Act of Parliament, let me spell out one or two of the phrases. By 'unnecessary price fluctuations', are meant price movements which are not closely related to past or desired changes in production costs. By 'imbalance' is meant a situation where, for example, supplies have been built up to such a level that the market price realized is too low to make production worth while.

Both these problems are figuring in current discussion of managed markets, whether on a national or international level. The elimination of cyclical or irregular fluctuations in farm product prices is now widely accepted as a desirable aim—both from producers' and consumers' points of view. The essential point is that market instability (i.e., recurring but irregular and wide divergences between costs and prices) has a bad effect on productive efficiency. Stability (which does not, of course, mean unchanging prices)

provides a much more favourable climate for a farmer who has the technical and financial means to adopt cheaper methods of production. He will have greater confidence in applying these methods because the risk element in costs will be reduced; producers prosper or fail according to their competence in production. In the long run costs will come down and prices to consumers will eventually follow suit—provided there is no attempt to restrict output.

Stability

A major aim of a marketing board is to maintain stability by eliminating the weak seller—the man who sells at a price *below* production costs and who thus tends to push all prices down to this level. The boards have had varying success in achieving this aim; in general, the Milk Board has been most successful, the Potato Board much less so. The stability of cheese prices has been one remarkable feature of the food market, though space does not permit any discussion of it.

The problem of the weak seller is very common in a 'free market' where there are many small producers and a few large buyers. When supplies build up above their customary level some of the producers will be forced to sell at low prices—either because of their need for money, their lack of storage facilities or just through fear that prices will fall even more.

From the consumers' point of view the danger is that a board, in eliminating the weak seller, might try to raise or maintain prices at too high a level. Producers' boards are usually under strong pressure to act in this way; indeed, their strongest critics would argue that they are bound to act in such a sectional manner. Moreover, some supporters of the boards (including farmers) strengthen the critics' case by arguing that a board should act like a private commercial concern with a strong monopoly position, attempting to maximize the returns of participating producers. The terms of the marketing acts even provide subtle support for this approach, in that they do not require the boards to act in the public interest, only to avoid actions contrary to the public interest. This is a fine point, but it can nevertheless have important practical consequences in policy-making.

Policies in the public interest

My own view is that marketing boards should be positively required to pursue policies which are in the interests of the public as well as in those of the producers. As we have seen, short-term price stability is one way of making these interests compatible; more complex is the question of achieving a long-term balance between supply and demand. Under what circumstances can a board help to get a better balance?

It is obvious that the average level of prices (at present, guaranteed prices) will be a decisive factor. If this price level is much too high or much too low, then no activities by a board will have a lasting effect. But in practice the problems are more marginal and the most relevant situation is where the board's policies have the effect of expanding output and consequently lowering producers' unit returns at a faster rate than would have been the case without the board. While no one can prove that other trends would have taken place in the absence of boards, the actual movement of milk and egg prices in recent years might suggest that producers had more to worry about than consumers! In a period (roughly 1956–62) in which the

general retail price index went up 18 per cent, the group retail index for 'milk, cheese and eggs' went up 8 per cent, while producers' prices fell by over 10 per cent for milk and over 20 per cent for eggs.

The great temptation in such a situation is for producers to try to raise prices by restricting output through individual quota arrangements or other means. Quotas may occasionally be justified as stop-gap measures but, generally speaking and in the long-run, they have adverse effects on the prosperity of the agricultural industry as well as conflicting with consumers' interests. Expansion provides the best climate for improved efficiency, and a board which concerns itself with helping producers to cut costs is in a much stronger position if, at the same time, it does not have to urge the reduction of output. Boards should, therefore, actively help to improve productive efficiency and must accept the consequences of expansion. Boards which have slowly but steadily increasing supplies to market must reach out beyond the point of first sale of the farm product. They should not only cultivate the consumer by 'pinta'-type advertisements, they must be practically involved in the many economic processes of distribution, recognizing that consumers no longer buy just 'food', but food combined with a great many different services. If, as some critics suggest, the boards should be doing more to increase the efficiency of distribution, then they should be encouraged, not hindered, in attempts to extend their economic activities and should receive public support in commercial or political disputes with existing interests which may result.

Consumer welfare

In choosing what to do beyond the farm gate, a board must try to act in a way which not only assists producers but also increases the welfare of consumers of their product. For example, I believe the boards should concentrate on promotional activity which mainly affects services and availability. The Milk Board, for instance, gets at least 2s. more for liquid milk than for milk for butter-making. This means that the Board could subsidize certain services associated with selling more milk up to, say, 2d. a pint and still be 8d. a gallon better off for the amount of the increased sales. True enough, the milk in itself could not be sold at less than the current retail price (except in a welfare scheme) but a service (e.g., in slot machines or dispensers) could be provided free, the cost being borne by the Board.

This kind of cross-subsidization, like its close relation price differentiation, is highly unpopular with some critics of the boards. It is not always recognized that, if such differentiation were not publicly practised by a board (e.g., in selling liquid and manufacturing milk), then it would frequently be hidden within the private economy of the large firms which dominate the food processing and distribution trades. Moreover, such firms would invariably choose between persuasive advertising and the subsidization of services on profit rather than welfare grounds.

Boards' role in modern society

This brings me to the last point. Anyone who thinks that the abolition of marketing boards (and guaranteed price schemes) would leave us with a free and perfect market in food products must have been asleep for a generation or more. Look at almost any agricultural product market and what do we see? In the words of an American government official, at a

Congress hearing in August, 1961, the trend is towards the 'concentration of an ever larger portion of various parts of the marketing, processing and distribution system in fewer firms of large size and great market power'.

In this situation, and if marketing boards are to serve producers and consumers alike, we must take a more positive view of their institutional role in modern society. In essence, they should develop as centres of countervailing power which help to reduce the undesirable effects of recent trends in the food industry. It is disappointing, if understandable, that in Britain so many free market economists should choose to direct most of their fire at the much easier political target of the marketing boards rather than at the oligopolistic tendencies in the private sector of the market. Perhaps this should be taken as an admission that trust-busting on American lines is not expected to be very effective.

Compulsory powers for marketing boards are essential and I favour giving them the maximum amount of authority over home supplies and complete freedom to enter into processing, distribution and retailing. But I also believe they should be explicitly required to act in the public interest and that a permanent Government-appointed Food Commission (on the lines of Neddy or Nicky) should have continuing powers of investigation and reporting in all spheres of the marketing of agricultural produce and foodstuffs. Moreover, Government must ultimately control imports and determine the level of guaranteed prices.

Concretely, this general approach means new trading boards for cereals and fatstock, increased powers for the Egg Board, and expanding activities by the Milk and Potato Boards. It also means that farmers must stop expecting the boards to act predominantly out of sectional interest. No producers, and least of all producers of food, should hesitate to declare their common interest with consumers in adopting marketing policies which are, and can be shown to be, of mutual advantage.

George Houston, M.A., B.Litt., is lecturer in Agricultural Economics at the University of Glasgow. He took his first degree in economics at Edinburgh and then went to Balliol College, Oxford, to do post-graduate research in agricultural economics. He has published several articles and monographs on agricultural marketing and policy, and is at present acting as consultant to FAO in a study of the world meat market.



Inwintered in-lamb ewes can earn a profit on mainly arable farms, judged by experience in N. Lincolnshire

Sheep under Cover

E. S. Carter

MANY farmers in North Lincolnshire, especially on the lighter lands, hold that a ley is necessary as a break in the rotation in order to maintain soil structure and as a complete change from arable cash crops. These leys, based on ryegrass, may be of one or two years duration, and a typical rotation might be corn-corn-peas-corn-corn-ley-ley; or where potatoes are taken, corn-corn-ley-peas-corn-corn-potatoes. The problem arises what to do with the leys. Dairy cattle need a large capital investment and beef cattle are difficult to manage profitably on short leys in large fields. The answer seems to be a sheep flock.

The rate of stocking is, of course, of vital importance. A low stocking of $2\frac{1}{2}$ –3 ewes per acre is of no use, since the return from the ley break is too small in comparison with the cash crops in the rotation. The endeavour must be to raise the gross margin to the level of a cash crop such as barley, and this must

mean at least 5 ewes per acre in the summer months. Although a well-managed ley will carry 5 ewes per acre—possibly 7 or 8 during the summer months—the limiting factor is the ability to winter them.

One- or two-year leys suffer severe damage if ewes are wintered on them; in some cases the ley has been completely killed out by treading. And even if this does not happen the ley will not produce early grass in spring. If the flock were to be kept inside during the winter, this would be one way of solving the problem.

Simple essentials

Farmers in Lindsey inwintering their ewe flocks have found increased productivity in the following season from rested leys. Labour conditions are greatly improved, for it is certainly easier to look after a large number of ewes under cover during bad weather, and feeding can be arranged more conveniently in yards than in fields.

Elaborate buildings are not needed. The most satisfactory arrangements consist simply of a roof erected in a sheltered position, making use of existing buildings and straw stacks. A barn-type building with eaves at a minimum of 12–14 ft is quite satisfactory. The sheep must be free from draughts, but there should be a through movement of air over the sheep to reduce the dangers from condensation.

Experience suggests that 10–12 sq. ft of floor space per ewe is about right. There seems to be no reason why old buildings should not be adapted for the purpose—for example, double range cowsheds would be suitable if there is reasonable roof space and air movement. It is essential that there should be adequate trough space (12 inches per ewe) and similarly there must be sufficient room for feeding hay and silage (6 inches per ewe if racked).

Sheep can self-feed certain types of silage successfully, and this is being done satisfactorily on one farm where pea haulm silage is available. Three inches of feeding face per ewe is allowed.

Water is very important for housed sheep and it must be available all the time. If the supply is restricted the sheep may stop eating. Access to minerals also seems to be important, and housed flocks consume considerable quantities.



Racks control self-feeding of silage



Inwintered in-lamb ewes can earn a profit on mainly arable farms, judged by experience in N. Lincolnshire

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Racks control self-feeding of silage



Ewes and lambs in an open shed

Handling inside

On those farms where the sheep have been brought in for the winter, ample straw is available to make good bedding. Wood shavings make an equally acceptable alternative.

The amount of labour involved in handling the flock under cover depends, of course, upon the layout, but it is not great. There is no doubt that shepherds prefer the housed flock once they have got used to it. In one well-laid-out shed, a single shepherd carried out the daily routine with a flock of 670 ewes in just over three hours a day.

Normally the ewes are brought under cover during late November and early December, when conditions outside are deteriorating and food supplies reduced. They should come in when they are dry, to avoid condensation. They seem to get sufficient exercise in the yard, and there have been no reports of difficulties at lambing time due to lack of exercise. Some farmers have inoculated their ewes with vitamins A and D, and pneumonia vaccine, at the time of housing. The ewes customarily remain inside until lambing and then lamb in separate pens in the usual way. They are then hardened off in a paddock close at hand and turned away on to the leys. The health of flocks in North Lincolnshire where this system is being practised has been entirely satisfactory up to date.

Farmers in Lindsey are now able to carry heavy rates of stocking in the summer where the only grass on the farm is a one-year ley and there are no facilities for wintering a large ewe flock on old pasture or long leys. To quote one example, 700 ewes and their lambs are being carried on 90 acres of one-year ley after spending the winter inside. Previous attempts to raise the summer stocking rate failed because of the damage to short leys by out-wintering.

Inwintered ewes will consume about $3\frac{1}{2}$ cwt of hay, compared with $2\frac{1}{2}$ cwt when kept outside.

How worth while is it?

What are the economics of increasing the stocking rate and keeping the flock inside? Assuming 7 ewes to the acre in summer and the flock inwintered, then with 100 ewes:

Summer stocking with 7 ewes per acre		
<i>Sales</i>		£
150 fat lambs		1,070
Wool		120
Cull ewes and rams (flock life of ewes 4 years— losses of ewes over the year 5%)		100
		<hr/> 1,290
<i>Less replacement ewes and rams</i>		310
		<hr/>
GROSS OUTPUT		980
<i>Variable Costs</i>	£	
Concentrates		
Ewes 65 cwt @ 25s.	}	125
Lambs 31½ cwt @ 28s.		
Hay		
350 cwt from 10 acres ley— variable cost of production £6.5 per acre	65	
Grazing		
14 acres— variable cost of production £5.7 per acre	80	
Straw		
3 cwt per ewe—15 tons @ £2	30	
Miscellaneous		
Medicine, Vet., dips, light, etc.	80	
Lambing and shearing bonus	20	
		<hr/> 400
GROSS MARGIN		<hr/> 580

The ewes will require a total of 24 acres of grassland for hay and grazing, making the gross margin per acre £24, which is comparable with that for some arable crops. This would be achieved only if the ewes were kept in existing buildings; there would naturally be a charge on the ewe flock if a building were to be erected specially for housing them. Based on a 12 sq. ft per ewe, and without allowing for any Farm Improvement grants, a suitable building would cost about £420 if written off over 10 years; then depreciation on the building and interest on the capital would work out at £65 a year for



Half-bred ewes in a more enclosed shed

the 100 ewes. This reduces the gross margin from inwintering the 100 ewes to £515 or £21.5 an acre. With conventional management 24 acres of grassland would carry $2\frac{1}{2}$ –3 ewes an acre, showing a gross margin of £370 or £15.5 an acre. It will be seen, therefore, that even if a building had to be erected for the purpose, a case can be made out for inwintering in-lamb ewes, thus making greater use of short leys and allowing the whole farming system to be intensified.

On farms in Lindsey where this system has been practised and where short leys are grown, the productivity of the farm has been increased. The technique is well worth consideration elsewhere, but it should not be adopted without careful planning so that the sheep enterprise fits well into the complete farm system.

E. S. Carter, B.Sc.(Agric.), is the N.A.A.S. County Advisory Officer for Lincolnshire (Lindsey). He is especially interested in farm management and the problems of farm planning.

R. P. Charlesworth

*explains how piglets are produced by
hysterectomy to establish clean herds*

Disease-free Pigs

OVER the past ten years many of the problems facing pig producers have been studied with great effect. From these studies have come such introductions as controlled environment housing, home-bred Pietrain-type pigs produced by cyclic crossing for the heavy market, successful early weaning and, the latest of these, disease-free pigs for farm use.

Before talking about disease-free pigs, it is as well to define clearly the type of pig involved in relation to its health status. Disease-free pigs are delivered by an operation known as hysterectomy. This is the removal of the complete uterus from the sow, and such piglets as are delivered by this technique are called hysterectomy-produced pigs. This, of itself, however, tells us nothing of their health status, for they could subsequently be adopted by a sow farrowing at a similar time, pick up her disease burden and still be correctly described as 'hysterectomy-produced'.



Despite the mud, these pigs produced by hysterectomy went ahead without any set-back

To get a pig free from the important farm diseases, we must carry this process two stages further: first, we must rear the hysterectomy-produced piglets in a sterile environment, and second they must gradually be conditioned for farm life. This is a highly technical business and must therefore be undertaken by a reputable organization under supervision by veterinary surgeons. The result we call an S.P.F. (Specific Pathogen-Free) or Minimal Disease Pig.

The Pig Industry Development Authority have drawn up a set of minimum standards and published a list of those centres which have agreed to abide by them and submit themselves to inspection.

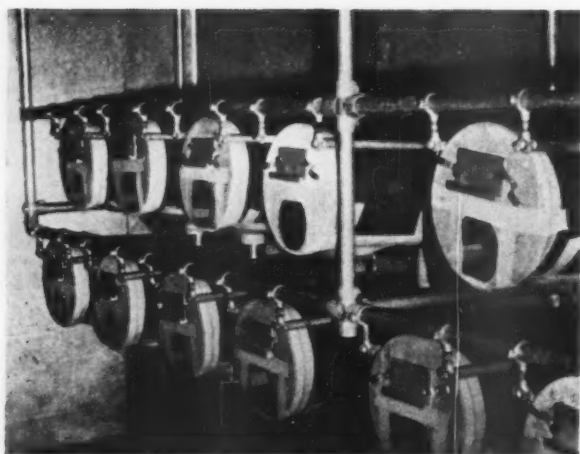
Disease is costly

A question often asked is, why is it necessary to go to such elaborate lengths to rid a farm of its disease burden? The answer is that the value of any pig enterprise is measured by the number of pigs sold per year, plus the pig's efficiency to convert the cheapest foods into quality pig meat. So the farmer has two yardsticks: numbers sold per year, and food conversion.

Many factors affect a year's output, and it is not within the scope of this article to discuss them in any detail. These include, however, genetic potential of the stock, their housing and management, and, of course, their health.

Food conversion can be affected by many factors including housing, management, breeding, and again the health of the herd. Any disease will upset the pig's appetite, and this in turn will affect food conversion. The devastating effects of diseases such as virus pneumonia in its chronic form are all too commonly seen on many farms. Growth rates are lowered, food utilization is weakened, uneven batches of pigs within similar age groups are seen, and working to a contract becomes a major headache.

After a programme of repopulation has been worked out, the selected stock are sent to one of the organizations concerned with S.P.F. pigs. Here



In the rearing unit the litters are individually housed in disposable incubators

they undergo a veterinary examination and are kept in isolation for about two weeks prior to the date of operation. On the 112th day of pregnancy, the hysterectomy operation is carried out and the uterus passed into a sterile operating hood. Skilled veterinary surgeons, working through rubber gloves, remove and dry off the piglets, then select and earmark them as necessary. The young are then transferred to a sterile carrying box contained in the main body of the hood and put into the rearing unit.

In the rearing unit the litter is housed within an isolation room in individual incubators for the first two weeks and is fed a sterile colostrum replacer with the required additives. Over this period the piglets are highly susceptible to disease. The air they breathe has to be filtered, also the technicians who look after the pigs have to wear sterile clothing.

From two to six weeks of age, the litter is grouped and housed in a brooder, where they can then be conditioned to a farm environment. The sterile diet is gradually replaced by conventional pellets and tap water, so that they acquire a desirable flora in the gut, and a supply of this food is delivered to the farmer with the pigs to ensure an easy transition on to farm rations at about six weeks. At this age they will be accustomed to farm temperatures and food, and will have been vaccinated to protect them against various troubles with which they could come into contact back on the farm. In practice they are very hardy and fit.

Going about it

For a normal repopulation, the farmer will select his best sows with known service dates, and will get in touch with a reputable organization producing S.P.F. pigs to book them in. A veterinary officer from the organization will visit the farm with the farmer's veterinary surgeon to talk over the repopulation programme and the disease history of the farm. The latter has some bearing on the way the piglets are to be conditioned in the rearing unit.

This having been done, the required number of sows are then delivered to the holding pens between ten and fourteen days prior to the date of operation. The farm and its buildings are emptied of conventional pigs and thoroughly cleansed, disinfected and rested for a minimum period of six weeks to break the cycle of any remaining troubles.

During the colder months it is advisable to introduce the pigs into a small pen or poultry ark and then to acclimatize them gradually to the farm conditions. Thereafter these pigs can be reared as normal pigs, except for a slight feed restriction to avoid any leg weaknesses showing up in certain strains. From these the nucleus of a breeding herd will be selected.

Keeping them disease-free

When the farmer has obtained his disease-free pigs and put them in a clean environment, it is then up to him to keep out disease. This is not difficult if a few simple rules are adhered to. By far the most important is avoid any contact with ordinary pigs, both by pig and by man. This is simple enough, by closing the herd to pigs other than those of the same health status and by wearing overalls and boots which have not been outside the piggery.

Facilities for washing and disinfecting boots, etc., must also be provided at all entrances to the pig area, and all unnecessary visitors should be discouraged by putting up notices and locking gates. Pigs kept out of doors must be double-fenced to avoid contact with a neighbour's stock. Collecting lorries must be prohibited from coming up to the buildings, as dirty straw or the escaping pig can always get into the piggery. A simple loading pen near the farm gate will be a satisfactory way round this problem. No vet will object to donning the clean overall and boots provided for him before coming into the piggery.

Good basic material

Let me make it quite clear that an S.P.F. herd is not the be-all and end-all of a pig enterprise. Without good genetic material it is clearly a waste of time and money. The results achieved by such pigs on farms in this country have been very encouraging. The average food conversion to bacon weight seems to lie between 2.55 and 3.00, with days to bacon about 160 or less. Mortality rates have been very low indeed.

CORRECTION

Dr. W. E. Shewell-Cooper

We regret that in the biographical note at the foot of page 493 in the October issue it was stated that Dr. Shewell-Cooper is Superintendent of the Swanley Horticultural College and Garden Editor of the B.B.C.'s North Region. These were former posts and are not now held by Dr. Shewell-Cooper.

N. T. M. Yeates

argues in favour of a Fleshing Index to get an objective assessment of beef carcass quality



Beef on the Hook

Competition Judging

BEFORE attempting to judge beef carcasses we must set our sights correctly and so ask ourselves what are the most important things to be measured.

Some might look for light weight ('handy' trade size); others might say youth is all-important. Still other judges, looking for overall attractive appearance, would attach high importance to such attributes as neatness of conformation, bright red flesh, and firm, smooth, white fat.

A few judges might include marbling as a necessary attribute and, perhaps, look for such subjectively assessed qualities as sappiness and texture of meat.

My own view is that only some of the above considerations are important and that the most important point of all has been omitted from the list—namely, recognition of efficiency of production in the growing animal. We must make our awards of merit to the carcasses of animals which, in their particular environment, are the top producers. And since the prime objective in growing beef cattle is to produce a lot of red meat, relatively little bone and just sufficient fat for the needs of cooking and safe storage, these are the things that must be measured.

Measurement principle

It will be apparent that if two carcasses are the same length yet one weighs 700 lb while the other weighs only 500 lb, then the 700 lb carcass must be thicker, blockier or chunkier. It goes without saying that it is also from the animal which has grown faster. They are both probably about the same age (having the same development of bone), but one is 200 lb heavier than the other.

This system of relating length to weight gives what is called the fleshing index or the 'ponderal index' of D'Arcy Thompson in his book *Growth and Form*. It is a measure of blockiness, and in the above example the 700 lb carcass would have a fleshing index 200 points above that of the lighter one. The higher the fleshing index the better, provided it has not been achieved by over-fatness. Accordingly, from knowledge of the average weight/length relationship of a specified type of cattle carcass, any particular carcass may be measured to see how much heavier or lighter than average it is for its length. This gives its fleshing index. Then its fat status may be measured (at the surface exposed by quartering at the tenth rib), and if the carcass is over-fat, an appropriate deduction depending on the degree of over-fatness made to the fleshing index. This deduction represents the estimated weight of fat which would have to be trimmed from the carcass to make it acceptable.

Details of procedure

The above gives the broad principle. The following are the actual procedure details.

Each carcass is measured for length with a steel tape, from the anterior edge of the pubic bone to the anterior edge of the first thoracic vertebra. Fat status is also measured. Length and weight are then fed into a specially constructed slide-rule, which is simply a convenience for quick calculation of fleshing index*. If a carcass is over-fat the appropriate deduction is also laid off on the slide-rule.

This allows all the carcasses to be ranked in order of net fleshing index, while it also gives knowledge of which carcasses are over-fat and by how much. From this information the likely place-getters are selected, whereupon a final inspection is made of them. If there are no blemishes such as dark coloured muscle, over-yellowness of fat, insufficient fat cover, gross unevenness of fat, then no adjustments are necessary and the placings stand as determined by measurement. An over-fat carcass should not be awarded first prize, for it will be eligible for championship award, and a champion should not have to be trimmed. However, if after the over-fatness penalty has been applied a carcass still comes out among the place-getters, there is no reason why it should not get a second or third ribbon, for the measurements have shown it to be worthy of that on the value of its meat. A very great advantage of the scheme is that each exhibitor knows exactly what his entry scored.

Question of age

As regards age, my view is that age classes over four teeth should not be catered for; that there should be separate age classes for four teeth and two

*These slide-rules are available at cost price from the Registrar, University of New England, Armidale, N.S.W., Australia.

teeth; and that the milk-tooth steers should be split into two classes—carcasses over 500 lb going into a senior milk-tooth class and those under 500 lb into a junior class. Otherwise, there should be no ceiling on weight; for, provided the carcasses are not over-fat, weight for age is the very thing we must strive for. To penalize weight for age in any way seems to me to be a negation of all the aims of husbandry.

When the award of champion is being considered it is clear that the different age groups must be considered together. Age corrections to fleshing index are then necessary, for, with increasing age, bone growth slackens before muscle development and fat deposition, in that order; hence with age, it becomes increasingly easy for an animal to achieve a high fleshing index. In actual fact statistics from many competitions show that 25 points is the correction for each age group from the milk-tooth animal, through the two tooth, to the four tooth stage. Thus a potential champion milk-tooth steer having a fleshing index of, say, 150 would be matched by a two-tooth at 175 and a four-tooth at 200. In the case of such a 'tie', however, the award should be made in favour of youth.

Other considerations

It will be seen that this system of judging pays no attention to the shades of difference in colour, either of lean or of fat, or to such things as marbling, texture of meat, sappiness, waxy sheen of fat and so on. These have been omitted purposely because they are things which research has so far been unable to prove important to tenderness, taste or nutritive value. It might be argued that in some markets some of these characteristics are valued. Perhaps they are; but against this must be set two questions:

(a) Is it right that unsubstantiated traditions should be perpetuated simply to satisfy some current market?

(b) Why should these points, mostly fads and fancies which bear no relation to production efficiency and which cannot be selected for in breeding, be allowed to confuse the picture in carcass competitions and so nullify the chances of genetic progress?

In any case, I have yet to see the steer carcass awarded first prize by the methods outlined above which would not make ideal eating. The method favours the quickest growers. So to win, an animal must be healthy, well nourished and of suitable breeding. Surely these things are the determinants of 'quality'.

A second article by Professor Yeates, next month, will deal with commercial grading.

N. T. M. Yeates, Ph.D.(Cantab.), D.Agr.Sc.(Queensland), is Associate Professor and Head of the Department of Livestock Husbandry at the University of New England, Armidale, N.S.W., Australia. Until January, 1964, he is on sabbatical leave in Great Britain and is stationed at the University of Nottingham School of Agriculture, Sutton Bonington, where he is working with Professor G. E. Lamming.

Dr. Yeates has taken a keen interest in the objective approach to beef carcass appraisal and has been carcass judge at leading Australian shows, including the Sydney Royal, in the three consecutive years prior to his visit to Britain.

The A.R.C. reports

A few items from the very readable and interesting Report of the Agricultural Research Council for 1961-62.

Price 5s. 6d. from H.M.S.O. or through a bookseller

New Winter Grasses • Harvesting Potatoes
Mechanizing Sugar Beet • Foot-and-Mouth Disease • Watercress

GRASSES collected in Algeria and Morocco may be making their mark on our winter grazing. They are varieties of tall fescue, which the Grassland Research Institute and the Plant Breeding Institute have been collaborating to improve. In yield trials during mild winters at Hurley these improved grasses have produced up to one ton per acre of dry matter between October and mid-March, which is about twice the quantity produced by Short Rotation rye-grass and three to four times that produced by other perennial grasses commonly grown. Digestibility is of a fairly high order for winter grass.

Like any other crop varieties, however, they have defects as well as virtues—for example, the severe winter of 62/63 showed a lack of hardiness, although they grow more than indigenous varieties in a mild autumn and winter, but normally yield much less in spring and summer. Their place in practical farming has therefore to be established by further trials, and two or three more years of experimental work may be necessary to do this. However, because of the considerable promise these grasses show, they have already been put into a wide range of trials and steps have been taken to multiply seed supplies in advance of trial results. By the end of 1965 there should be enough seed for all if the trial results justify its use.

At Wrest Park

Progress has been made at the National Institute of Agricultural Engineering in harvesting potatoes by lifting them whilst still attached to the haulm. It is hoped that this method will lead to an easier separation of tubers from

stones and clods, but clearly the success of the method depends largely on the potato varieties, since only those in which the tubers remain firmly attached to the haulm are likely to be suitable. The plant breeders are being encouraged to select such varieties. With a Dutch variety, it has proved possible to lift slightly more than half the crop by the haulm when fully mature.

A vegetable and root harvester has also been devised in which a pair of driven rotary crop gatherers are used, and a primary elevator conveys the crop into stillages. This machine has proved to be very successful in trials with carrots, sugar beet, turnips and beetroot, but will require modification before it can be used for lifting leeks and onions.

Problems concerning the mechanizing of sugar beet are still very much to the fore at the N.I.A.E., especially those of precision drilling of seed, mechanical thinning and weed control. The recent introduction of monogerm sugar beet seed has emphasized the urgent need for the development of precision drills, although, at the same time, it has reduced the effort required for singling.

A small-scale trial was carried out at Wrest Park during 1961-62 in which complete spring mechanization was attempted by combining the use of monogerm seed with chemical and mechanical methods of weed control, followed by machine thinning. The results gave a final plant population having over 90 per cent single plants without hand thinning. All the chemical and mechanical treatments saved labour of up to 50 per cent at the expense of about 10 per cent of the potential yield in comparison with normal hand singling.

At Pirbright

Following a serious outbreak of foot-and-mouth disease in South-West Africa in 1961, the Research Institute at Pirbright responded to an appeal by the veterinary authorities and provided approximately $2\frac{1}{2}$ million doses of vaccine, which greatly assisted in limiting the spread of the disease. In 1962, an African type of virus appeared outside that continent for the first time. It spread rapidly through the Near East and, by September, 1962, the disease had reached European Turkey. This presented a serious threat to the rest of Europe, since previous infection or vaccination against any of the strains of the disease normally found in Europe would offer no resistance to the new invader.

The FAO European Commission for the control of foot-and-mouth disease has recommended the use of inactivated vaccine for cattle, sheep and pigs in the border zones between European Turkey, Greece and Bulgaria, and the vaccine required for this operation is being provided by the Pirbright Institute.

At the N.V.R.S.

Watercress-growing is a very specialized and highly organized business. Although the total area of production is only about 500 acres, the value of the watercress is around £2,000-4,000 per acre each year. After a long history of apparent freedom from disease, dwarfed or dying plants showing a characteristic distortion of roots were first seen in Wiltshire in 1948. The disease became widespread and losses so great as to make many beds quite uneconomical. By 1950, when research was started on the disease, it was apparent that some method of control was urgently required.

Mycological investigation at the National Vegetable Research Station showed that the crook root condition was caused by a fungus and transmitted by zoospores which swam through the water in the beds. During the study of the disease a fortunate chance led to the discovery that minute traces of zinc (0.1 parts per million) introduced into the water would kill the spores, and from this a method of control has been developed. If the beds are fed from a central supply the zinc can be applied in the form of a solution of zinc sulphate. For beds which receive their water from a number of sources it is necessary to apply a compound that will release the zinc very slowly. This is achieved by dissolving zinc oxide in glass, which is then finely powdered. This 'zinc frit' is scattered on the floor of the cress bed and gives very satisfactory control. Excesses of zinc induce an iron deficiency, but precise methods of zinc application have been satisfactorily evolved.

Getting the Carrot Crop through the Winter

K. V. Cramp

HEAVY losses of carrots left in the ground during the past two severe winters have prompted growers to inquire if anything can be done to protect the crop against severe frost. Before the introduction of the rather more hardy Autumn King (Flakkee) types it was usual to store the winter crop in clamps—sometimes successfully, sometimes not. At that time carrot fly control was not very good and wastage was extremely high.

With the introduction of the Autumn King types and much better pest control, the winter crop has been left in the ground and earthed over to guard against moderate frost. This has worked well in normal English winters, but not so well when long spells of severe frost set in.

Refrigerated storage of carrots, investigated at the Ditton Laboratory by W. Hugh Smith, has proved to be very satisfactory for long-term keeping, provided it is properly carried out. But maincrop carrots are now grown as part of the farm rotation and few, if any, growers have refrigerated stores; and it would not be economic to build such stores for carrots alone. Another point to be borne in mind is that for any form of storage after lifting the

roots must be free from bruising and damage, and this is well-nigh impossible to achieve with our existing methods of large-scale mechanical lifting and handling.

Severe winters such as we have had recently are fortunately infrequent and in about seven years out of ten traditional methods of storing in the land have been satisfactory.

The grower is faced with the economic problem of how much he can afford to spend on storing his crop against the possibility of severe spells—about one year in four or five—bearing in mind that the price of carrots in a normal English winter is not high.

The answer would seem to be to protect or store a proportion of the crop in the field, clamp, or cold store and to lift by hand those which are to be clamped or cold stored after lifting.

Clamping

If the decision is in favour of clamping, then it should not be done until soil temperatures become reasonably low but before really severe frost sets in. The roots should be lifted by hand, topped and placed in containers for transport to a suitable site for clamping. This site must be well drained; a belt of trees on the south side would help to keep down day temperatures during sunny spells. Hugh Smith recommends building the clamp 3–4 ft wide at the bottom, 2–2½ ft high and not more than 20 ft long. Such a clamp would hold 2–3 tons of roots. Straw should not be placed next to the carrots. Soil is dug from round the base of the heap and thrown over the crop to form a layer 4–6 in. deep. The trench left round the base of the clamp will help drainage. During severe weather carrot tops or straw can be laid over the clamp to give added protection.

Storage in the ground

The traditional method of growing winter carrots is to drill in two or three rows 4–5 in. apart and then leave a wide space (about 20–24 in.) between the double or treble rows to allow for earthing over.

This method is likely to be adequate in any normal English winter but is relatively useless during long spells of severe frost. The Dutch growers, who generally speaking have much smaller acreages of carrots, use straw to keep out the frost; under severe conditions, even polythene sheets plus straw.

When I was in the Netherlands recently I was told that a combination of polythene sheets and straw did in fact keep out last winter's severe frost. But it should be added that snow over the straw probably helped not a little.

Polythene sheets may be laid first over the crop or in between two layers of straw. The total depth of the straw to be aimed at is about 12 in., and it should be laid loosely to improve insulation.

Strawing down with or without polythene is particularly suited to the modern bed system of carrot growing where about 12 rows are drilled at 3½–4½ inches apart to form a bed.

The author of this article, **K. V. Cramp**, is Adviser on vegetables in the Eastern Region of the N.A.A.S. He is also Liaison Officer with the National Institute of Agricultural Botany on matters concerning vegetables.



Cheddar

Strawberries

A. A. Tompsett

CHEDDAR has been the centre of a compact, but intensive, market gardening area for over two hundred years. Strawberries were first grown commercially here at the end of the nineteenth century and although, in common with other areas, it suffered setbacks from time to time, the crop has increased in popularity until today it is grown almost to the exclusion of all others.

The area is well favoured for early production with mainly south and south-west facing slopes and valleys of the Mendips. It is protected from the north and east, although variably exposed to the prevailing south-west winds.

Increasing specialization has given impetus to new developments aimed at getting earlier and better quality dessert fruit. The main radical change during the past ten years has been the swing to maiden cropping. Earlier and larger fruit, greater flexibility of cropping, reduced pest and disease troubles, and higher returns are the main advantages, which more than offset the extra costs of producing and setting out plants afresh each year. Another, more recent, development, again aimed at producing earlier fruit, has been the increasing use of glass cloches and polythene sheeting.

Varieties: maiden cropping

Cambridge Favourite is the most favoured variety. This and Cambridge Vigour account for over three-quarters of the estimated 350 acres of strawberries in the area. Vigour is the main early variety for cloching and growing in the open, while Favourite is well liked for its heavy maincrop yields of good-sized, firm fruit. Redgauntlet is increasing in popularity, as it is relatively trouble-free and often produces an autumn crop, especially when the spring crop has been cloched. Most present-day varieties, including Cambridge Rival, Prizewinner, Talisman, Merton Princess and Royal Sovereign, can be found. All are cropped as maiden plants. There is also the locally raised variety Axbridge Early.



A maiden crop of Cambridge Favourite. Well-grown crops such as this can yield over 6 tons per acre of dessert fruit

At least three-quarters of the acreage is normally replanted annually. In a season of scarce early runners, a greater proportion of old plants may, of necessity, be retained, but then only Cambridge Favourite or Redgauntlet. Most of the more progressive growers who take runner production seriously, have now stopped cropping any plants for the second year.

Plants raised on the holding

Maiden cropping of strawberries demands large numbers of early runners, and at Cheddar these are normally raised on the holding from certified stock brought in from specialist plant raisers the previous autumn.

Stock plants are set out in widely-spaced rows on well-manured land. In summer they are deblossomed, rogued, sprayed with systemic insecticides, and irrigated as required to produce a maximum number of runners for August and September planting. Although yields of over 50 runners per parent in August are possible, most growers with irrigation buy 1,000 stock plants for each acre (20–25,000) of fruiting beds they intend to plant the following year. Under less favourable conditions twice this number of stock plants may be required, and excess plants raised on reputable holdings always find a ready local sale.

For cropping in the open, Favourite is planted in August and Vigour mainly in September, although the first two weeks of September have sometimes resulted in blind plants and are generally avoided. The usual spacing is at 12 inches in rows 27 inches apart, giving approximately 20,000 plants per acre, but this is modified according to cultivating machinery, soil fertility and planting date, the latter two factors greatly influencing plant size and yield.

Although the heaviest crops are obtained by early planting on well-manured land, very vigorous plants ripen their fruit late, and early planting of Vigour is particularly avoided since, with a large leafy plant, fruit may be small, ripening delayed, and the disease risk increased.

Under cloches

Vigour intended for cloching are planted from the middle of September, 10–12 inches apart, in single rows. Barn cloches or polythene structures of similar dimensions are preferred; tent cloches are generally considered to be too small for crops at Cheddar. Glass is put over the plants from mid-February onwards and picking, which commences in early May, is often finished before the outside crop begins. Polythene is intermediate in its effect. It requires careful fixing and ventilation, and a system of metal frames, retaining wires and polythene curtains, designed by Mr. S. H. Brookfield at Cannington Farm Institute, has been widely adopted. The film is generally removed completely after the first two picks to lessen the risk of Botrytis; with glass, one of the roof panels is removed for the greater part of the picking period.

Three-acre holdings

The average holding comprises about three acres of strawberries, so this can normally be tended by the grower and his family for the major part of the year. Employed labour in any quantity is only called upon for strawing and picking.

Planting is by hand, using a broad dibber, although planting machines are used successfully on larger fields. Most growers prefer to hoe the crop by hand so that heavy equipment is not taken over the land, and wasteful headlands are avoided.

Whereas spraying has previously largely been by lance and hose, increasing use is being made of small, mobile, low-volume machines. Most crops receive a spring systemic insecticide, and many growers also apply D.D.T., captan and dinocap, the latter being widely used to control mildew on Cambridge Vigour. Botrytis causes serious losses in wet seasons, especially in crops of large, potentially high-yielding plants, where growing conditions are good.

A range of pests and diseases can assail the crop, and stem and bulb eelworm has been particularly troublesome.

Strawberry fields at Cheddar, as seen from the Gorge



Returns speculative

Because of the ever-present risk of failure due to weather conditions, pest or disease, reliable average economic data is difficult to obtain for an area such as Cheddar. Assuming reasonable returns, an average crop of 2½ tons should give a gross revenue of £700 per acre, while for heavier crops returns of over £1,000 per acre are common. However, since the specialist strawberry grower receives his returns over a matter of only a few weeks, he is greatly subject to the prevailing market price and weather conditions.

Alternative crops, such as anemones, spring cabbage and broad beans are grown on a limited scale, but they compare unfavourably with strawberries; other crops giving income at other times of the year present marketing problems and are often of low value.

Much land has been intensively cropped with strawberries for many years without ill effect, and there appears to be no reason why this cannot continue.

Double trend

At present there are two trends. To offset the problem of obtaining picking labour, some growers are intensifying their production with cloches and resting part of their land under short-term leys.

Meanwhile, some younger growers are breaking away from the old system of fragmented holdings, and developing a single, larger unit of land. With machinery and irrigation these holdings are better equipped to face increasing competition and adapt their production as the need arises.

The availability of good picking labour remains the greatest restriction to expansion of acreage. During the strawberry season several thousand pickers are drawn from surrounding villages, larger growers often collecting pickers from considerable distances.

All fruit is sold for the dessert trade, at first in ¼ lb and later in ½ lb punnets. These are packed into trays holding 6 lb of fruit and tied together in units of three. Cardboard trays are used for rail transport, but wooden containers are essential for road consignments and salesmen's returnables are generally preferred.

Growers are very worried over the impending closure of the Cheddar branch railway, since this has been of great convenience to them for loading the train in the evening to supply the early morning market the next day in northern and midland towns. As the need arises, resourceful growers will find alternative means of transport, but such perishable produce demands a swift, smooth ride to market if it is to keep the eye-appeal upon which its ready sale depends.

The author of this article, A. A. Tompsett, N.D.H., is a Horticultural Advisory Officer in the N.A.A.S. and since 1962 has been in the part of Somerset in which Cheddar is situated. He was formerly at Luddington Experimental Horticulture Station, where he was concerned with trials which included soft fruit and weed control.

R. B. MAIR



*Twin lambs are weighed
at High Mowthorpe, 12—24 hours
after birth*

Breeding from Ewe Lambs

*A good thing or bad? Trials at four Experimental
Husbandry Farms were designed to find out*

THE practice of tupping ewe lambs when they are seven to eight months old is widely followed in the grassland areas of the West Midlands. In many of these self-contained flocks the sale of young breeding ewes is an important part of the farm income, and by breeding from the ewe lambs a high output is maintained. There can be no doubt that these lambs later develop into highly productive ewes—long-lived and prolific.

But in other areas, in southern and eastern England, the practice is regarded with suspicion, many flockmasters believing that early breeding shortens the ewe's useful life. By delaying breeding until the shearling year it is felt that the ewe is able to complete her own growth before she carries a lamb and thereafter grows into a more vigorous animal with a higher lifetime production.

Experiments replace conjecture

To try to resolve the question of whether early breeding could profitably be practised in areas other than those in which it is traditional, four of the

N.A.A.S. Experimental Husbandry Farms have been carrying out experiments on the subject. The four farms are in very different areas, and each has used a different breed or cross.

<i>Farm</i>	<i>County</i>	<i>Breed of Ewe</i>	<i>Ram used on</i>	
			<i>Ewe Lambs</i>	<i>Ewes</i>
Boxworth	Cambridge	Suffolk Half-bred	Wiltshire Horn	Oxford
Bridget's	Hampshire	Clun	Clun	Clun
High Mowthorpe	Yorkshire (E.R.)	Scottish Half-bred	Suffolk	Suffolk
Trawscoed	Cardiganshire	Welsh	Welsh	Border Leicester

On each farm approximately 100 ewes were bred from as lambs, and the prolificacy, milking capacity, health and longevity of these ewes was then compared over their useful life with that of matched groups of ewes which were first mated as shearlings. The results from all four farms were in close agreement. They showed that with well-grown ewe lambs, between two-thirds and three-quarters of those put to the tup bred successfully and reared a single lamb. No particular difficulties were noted when lambing at twelve to thirteen months old and, although the lambs produced were at birth lighter than usual, their rate of growth was very satisfactory. The ewe lambs were obviously good mothers.

Early breeding not harmful

In the experiment at High Mowthorpe the ewe lambs were not flushed before going to the tups, as twinning was not considered desirable. The ewe lambs tend to drop lambs which are at birth smaller than normal and a good single lamb is preferable to a pair of weakly twins. After tupping the ewe lambs were kept on a gradually rising plane of nutrition and steamed up before lambing to ensure an adequate milk supply. At the same time overfeeding had to be avoided, since this would incur a danger of producing very large single lambs and therefore difficulties at lambing. In some flocks it is the practice to put the ewe lambs to the tup three weeks or so later than the rest of the ewe flock. This has the advantage of allowing them more time to develop before tupping and gives a chance of better conditions at lambing, but it has the disadvantage of prolonging lambing time.

Once the first crop of lambs were weaned off, when the ewes were 16-17 months old, the two groups of sheep were run together for the remainder of their lives and received identical treatment. Whilst still young the ewes bred from as lambs were slightly lighter in weight, and clipped rather less wool than the ewes not bred from until their shearling year; but by 2½ years of age these effects had disappeared. Thus early breeding did not permanently retard the development of the ewes.

In terms of lambs born per ewe, the ewes bred from as lambs were more prolific. For example, at High Mowthorpe the average number of lambs reared per year from each ewe tupped was 1.71 from the ewes bred from as lambs and 1.67 for those bred as shearlings. There was little difference in the effective length of the useful life of the ewes, and the culling rate was not increased by early breeding.

Extra lambs as a bonus

The results from these experiments showed that the extra lambs produced by mating the ewe lambs was a bonus gained at a comparatively low cost. At High Mowthorpe the extra cost of breeding from lambs amounted to under £2 per head; and included in this figure is a charge for the extra shepherding and steaming-up ration required in the lamb year, an allowance for the lighter wool clip at the first two shearings and an estimate to cover the slightly higher number of replacements needed to maintain flock numbers. With fat lambs costed at £7 5s. per head and store lambs at £6 each, the average lifetime return per ewe was £91 from the ewes bred as lambs and £83 from those bred as shearlings—a margin of £6 per head in favour of breeding from the ewe lambs.

These figures are applicable only in a self-contained flock in which the ewe lambs would be grazing land that is suitable for carrying ewes and lambs. In these circumstances tugging the ewe lambs should lead to an increase in the total number of lambs reared on the farm, so resulting in an increased output per acre. On farms that have an area of land unsuitable for fat lamb production but capable of carrying dry sheep, there is far less justification for tugging lambs.

When the results of the experiment are applied to farms where all the replacements for the breeding flock are brought in, it is much more difficult to decide whether breeding from ewe lambs is a desirable practice. Purchasing lambs instead of shearling ewes means that the capital outlay on stock is lower, but as the lambs are less productive in their first season the overall level of output from the flock is reduced.

Returns from four systems compared

Using the results obtained in the High Mowthorpe experiment and assuming an average purchase price of £12 10s. for shearlings and £8 10s. for ewe lambs, the returns from four systems of flock management have been worked out. The four systems are:

- A. Replacements all bought as shearlings and run on until culled for failure to breed or loss of teeth.
- B. Replacements all bought as lambs and put to the tup. Retaining all, whether breeding as lambs or not, and then dispose of as in A.
- C. Replacements all bought as lambs and put to the tup. Retaining only those which breed, selling the lambs which fail to lamb as fat hoggetts in spring and assuming no loss. Dispose of breeding lambs as in A.
- D. Replacements all bought as lambs, and put to the tup. Retain all, whether breeding as lambs or not, and then dispose of all after a further two crops—that is, as 3½-year-old ewes at a price of £8 10s.

System	Av. total sales per ewe per year		Av. replacement costs per ewe per year		Margin per ewe per year		Return per £100 invested in stock
	£	s.	£	s.	£	s.	
A	14	5	2	10	11	15	114
B	12	12	1	14	10	18	128
C	13	6	1	14	11	12	137
D	13	16	2	18	10	18	128

In these four systems the best return per ewe is given by SYSTEM A, where all replacements are purchased as shearlings. All the breeding sheep in the flock are highly productive and a good lambing percentage is achieved. In all the other systems, as the lambs reduce the lambing percentage the overall production is lower and the saving in replacement cost by buying lambs at £4 per head less than shearlings is not large enough to compensate fully for this reduction. In SYSTEM C, where lambs failing to breed are disposed of, the level of production is reasonably high and the margin per ewe comparable to that achieved by buying in shearlings. This system is dependent on all non-breeding lambs being disposed of without incurring any loss, and is attractive on farms capable of fattening these lambs for sale in May at a reasonable price or of running them during the summer on land of low potential, for sale as shearling ewes in September.

It has been suggested that the lambs which conceive when put to the tup are the quickest maturing and most prolific sheep and that by retaining them for breeding, and disposing of the non-breeders, a selection of the best sheep is being made. The results of the experiment at the Experimental Husbandry Farms tend to support rather than refute this idea, but unfortunately the number of non-breeding lambs involved was too small to prove the theory. SYSTEM C also gives the highest return on capital.

SYSTEM D is favoured by farmers who believe that because there is practically no depreciation in value when the ewes are sold, the returns will be high. This is true, but where one-third of the flock are ewe lambs the replacement cost is high and the lambing percentage is much reduced.

These figures are, of course, to some extent misleading, since they apply only to a single set of values for the various classes of sheep. If ewe lambs can be bought for less than £8 10s. or shearlings are costing more than £12 10s., then the balance is tipped more in favour of ewe lambs.

Lambing percentage 130

They are also based on information obtained when no selection was made of the best ewe lambs for breeding. If only very well grown lambs were put to the tup, then the performance is likely to be very much better. This was borne out by our experience at High Mowthorpe, when in 1961 we put 40 selected ewe lambs to the tup and 36 of them lambed down a total of 52 lambs. This lambing percentage of 130 was far higher than that achieved in the experimental work and makes breeding from ewe lambs a more attractive proposition.

Breeding from ewe lambs is therefore likely to lead to an increase in the return on capital in most circumstances, but it will reduce the return per ewe unless a high output is achieved in the first year. Each flockmaster has to make up his own mind and evolve a system which will best suit his own particular circumstances, but there are good reasons to believe that the practice could be followed profitably on many more farms.

R. B. Mair, B.Sc., is an Advisory Officer in the N.A.A.S. and is stationed at the Ministry's High Mowthorpe Experimental Husbandry Farm, Duggleby, Malton, Yorkshire.

PIONEERS OF MODERN BRITISH FARMING

Lord and Lady Iveagh, who celebrated their diamond wedding last month

The Epic of Elveden



LORD IVEAGH, K.G., C.B., C.M.G.
2nd Earl of Iveagh, born London, 29th March, 1874. Educ. Eton and Trinity College, Cambridge. Chancellor Dublin University. Dep. Lieut. Suffolk and Surrey, and Lieut. of the City of London

Arthur Mitchell

DURING a visit to Canada in 1910, a 36-year-old British politician and social worker named Rupert Guinness made the disturbing discovery that many of his fellow countrymen who went there to take up farm work failed to make good. He was convinced that all they really lacked was the right kind of training, and on his return to England he at once began to explore the possibilities of remedying this deficiency.

The outcome was the foundation on his 700-acre estate at Pyrford, near Woking, Surrey, of an Emigration Training School, with a graduate of Ontario Agricultural College as its manager. The scheme proved an outstanding success and but for the first World War it might well have continued for many years.

Thus was awakened in Rupert Guinness, son of the first Earl of Iveagh, an interest that was to lead many years later to the transformation of the Elveden Estate in West Suffolk—a project that began as an experiment and grew into one of the most outstanding farming enterprises in Britain in modern times. It has set an example that has profoundly influenced the development of a region traditionally held to be of little agricultural value. Indeed a great deal of the hungry soil of the Breckland is today farmed on the Elveden pattern, the basic principle of which is the exploitation of the drought-resisting and soil-enriching qualities of lucerne.

Dairy farming in Surrey

As he began to devote more and more attention to farming, Rupert Guinness found himself strongly attracted to dairying. Pyrford, a light-land estate which he had bought from his father-in-law, the 4th Earl of Onslow, in 1907, became the home of Shorthorn and Guernsey herds that were to make important contributions to Elveden. In particular, he was concerned about standards of milk production, and his own farm gave the lead to improved methods. He was one of the first three farmers to obtain a licence under the milk (Special Designation) Order. Later, with Mr. Wilfred Buckley, who was Director of the Milk Section of the Ministry of Food during the 1914-18 war, and himself a dairy farmer, he formed the Tuberculin Tested Milk Producers' Association, one of whose objects was to educate the public in the value of T.T. milk.

At about the same time he did milk producers another great service by coming to the aid of the Research Institute in Dairying, which was then housed in a villa in Reading and had no land of its own. Lord Elveden, as he had now become, met a great part of the cost of purchasing and equipping Shinfield Manor, with its 357 acres, not, to quote one biographer, just to show his generosity but to enable the Institute to live and develop until its value to the community was recognized and it became self-supporting. For nearly forty years he was Chairman of its governing body, and in recognition of his work there the University of Reading conferred on him the degree of Honorary Doctor of Science.

Inheritance

When he inherited the 23,000-acre Elveden Estate in 1927 the chances of successful farming on this blowing sand must to most agriculturists have seemed slim to the point of non-existence. Even on the better lands, arable husbandry was in a sorry state and there was a trend towards ranching. But Lord Iveagh, convinced that British agriculture would rise again, was prepared to back his judgment with money and hard work. He visualized Elveden as an agricultural estate standing firmly on its own feet, and he brought to the task of building it not only capital and enthusiasm but also a thoroughly practical outlook and a scientific mind.

His father had acquired it in 1894, primarily for its sporting value. This, too, was a time of acute agricultural depression, and apart from providing employment and ensuring the maintenance of the shooting, there was little justification for his policy of cropping part of the land on a four-course shift.

In 1927 there were only about 100 head of cattle (mostly bullocks) at Elveden, and the chief sources of income were sheep and barley. One thing was abundantly clear to its new squire; if he were to make farming pay there, he must get more stock on the land. He decided on dairying, partly because of his knowledge of this branch of production and partly because there was no evidence that beef as such would show an economic return.

He concentrated initially on the better-manured land near the farmsteads, giving a high degree of priority to improved water supplies and fencing against the hordes of rabbits that ravaged the fields. Many difficulties had to be overcome, however, before Lord Iveagh's plans could begin to take shape. For one thing, establishment of T.T. herds was a slow business in those days: disease-free cattle were scarce and testing had still to be perfected. But



Crawler tractors working on reclaimed Breckland

gradually the existing herds were cleaned up, and in 1932 he began buying Shorthorn heifers in batches of thirty to forty. Reactors were disposed of immediately. Later, Guernsey calves were imported from the Island, which had long been clear of tuberculosis, and calves were also brought from Pyrford as a first step towards integrating the two estates.

Lucerne, the touchstone

Soon Lord Iveagh began to attach increasing importance to milk production as an enterprise in its own right. Summer feed was a major problem and in the mid-1930s he decided, with some misgivings, to experiment with grazing of lucerne; until then it had been grown only for hay. It was found that with carefully controlled grazing the plant did not suffer markedly, nor was there an undue incidence of bloat. The method was therefore quickly extended to all the farms on the estate. This in turn permitted heavier stocking, and by 1939 the cattle population had reached 850 head. In the meantime a policy of stringent culling had been adopted and a start had been made with the line breeding that eventually raised the Elveden herds to the highest level. At that time there were about 4,800 acres in tillage, although some of the land was being cultivated chiefly for game.

On the outbreak of war Lord Iveagh set about the task of bringing the 'game lands' into full production—a move for which he had already prepared his plans—and at the same time he embarked on the reclamation of the outlying brecks and heaths of his estate. If further evidence had been needed of the worth of the Elveden system it was certainly provided here. Arid tracts, of whose potential usefulness even he had not been completely convinced, were made to produce excellent fodder and arable crops. The best procedure in most cases was to take two crops of cereals and then provide a measure of fertility for the lucerne by folding cattle or sheep on catch crops (generally rye or rape) or by green manuring. This period, too, saw a big increase in silage production on the estate, mainly in pits.

As the size of the herds grew and pastures began to be laid down far from the homesteads, milking parlours gave place to bails, incorporating coolers run from the same engine as the vacuum—a system that worked well for many years

With the techniques of reclaiming this kind of land now well proven, Lord Iveagh—who in farming, as in all his other activities, has had a knowledgeable and enthusiastic ally in his wife—was never in any doubt as to his future policy. In the next seven years he ploughed up another 2,350 acres, bringing his total tillage area to well over 8,000 acres.

Year by year new chapters have continued to be added to what Sir John Russell has called the epic of Elveden. But in the 1950s, when reclamations were extended to the even less promising heather-covered warrens, a new problem arose. Much of this land is so acid that even after extremely heavy liming it will not grow a reasonable crop of lucerne. The answer was found after a series of experiments that on such land the most satisfactory fodder crop is the cocksfoot ley, following two pioneer crops of rye and one of oats.

Elveden today

Today there are about 10,000 acres of the estate in cultivation and new land is still being ploughed, although the pace of expansion has now slowed down. Inevitably, the original system has been modified. Over a great part of the estate soil structure and fertility have improved to such an extent that the lucerne leys, which at one time were normally left down for five or six years, are now ploughed-in after three. Companion grasses, formerly used in only a small proportion of fields, are included in most of these leys. Silage, much of which is self-fed, has become the main winter bulk ration. Portable bails have been superseded by modern milking parlours and bulk tanks.

In Lord Iveagh's early days at Elveden sheep came close to banishment, but they have a very useful place on the estate today as scavengers, following the cattle on grass leys, and as consumers of catch crops. Latest addition to the range of livestock enterprises is pig production on highly intensive lines. It began with nothing less than the establishment of a herd of 300 Essex sows, which are crossed with Large White and Landrace, and to this has been added a herd of virus pneumonia-free Large Whites.

The biggest development in livestock policy over the last decade has, however, been the increased emphasis on beef. This, like the rise in sheep numbers, has to some extent been dictated by the spread of reclamations to the more distant parts of the estate. It has also been a logical accompaniment to the greater use of cocksfoot. All Shorthorn heifers are now Angus crossed, and the female progeny are mated with Herefords. Some of the second-cross heifers are also crossed with the white-faced breed to provide additional breeding stock needed to keep pace with the increase in grazing land. Present numbers include: 735 dairy cows, 819 young dairy stock, 1,204 beef cattle, 1,843 breeding sheep and 400 breeding pigs.

The arable rotation consists mainly of two crops of cereals (barley or rye), roots and barley. On the more acid soils three-year cocksfoot leys are followed by three crops of rye. These leys are always undersown as a safeguard against wind erosion in spring. For the past ten years cereal yields have averaged rather more than the national figure, and sugar beet production has been well above it.

Tradition lives on

Five years ago, when his grandson, Lord Elveden, came of age, Lord Iveagh gave him control of the farms and later handed over to him responsibility for the rest of the estate.

Lord and Lady Iveagh continue to pay frequent visits to the estate, and to talk with them about the way in which they have changed the face of this great area of Breckland is a stimulating experience. They readily understand, of course, that the future may bring more big changes to Elveden, but they have the satisfaction of knowing that the basic traditions they have established will be fully maintained—and cherished.

Arthur L. Mitchell, M.B.E., for many years agricultural editor of the *Eastern Daily Press* and founder-editor of *Farming World*, is a free-lance journalist and consultant. He is a Fellow and former Chairman of the Guild of Agricultural Journalists.

The Ministry's Publications

Since the list published in the October, 1963, issue of *Agriculture* (p. 495) the following publications have been issued.

MAJOR PUBLICATIONS

Copies are obtainable from Government bookshops (addresses on p. 554), from Divisional Offices of the Ministry or through any bookseller at the price quoted.

Experimental Husbandry Farms and Experimental Horticulture Stations—Progress Report, 1963 (New) 6s. 6d. (by post 6s. 11d.)

This is the fourth annual report of the work done and in progress at the Ministry's experimental centres. It includes some results of long-term rotational experiments in soil fertility, a review of recent fodder conservation work and a report on a performance test of Hereford bulls. Results of experiments on crop sequences in mobile glasshouses and on techniques for growing various horticultural crops are included. The horticultural section also includes a review of the work done on the manuring of vegetables.

The Farm as a Business. 1. Introduction to Management (New) 2s. 6d. (by post 2s. 11d.)

LEAFLETS

Up to six single copies of Advisory Leaflets may be obtained free on application to the Ministry (Publications), Government Buildings, Block C, Tolcarne Drive, Pinner, Middlesex. Copies beyond this limit must be purchased from Government Bookshops, price 3d. each (by post 6d.)

ADVISORY LEAFLETS

- No. 307. Root-Knot Eelworm in Glasshouses (Revised)
- No. 513. Culling Laying Hens (New)
- No. 520. Liquid Feeding of Tomatoes (New)

**SUCKLED BEEF CALVES FOR THE AUTUMN SALES
BRING NEW PROBLEMS OF HOUSING**

Replanned Buildings for the Suckling Herd

L. J. Williams writes from Aberystwyth

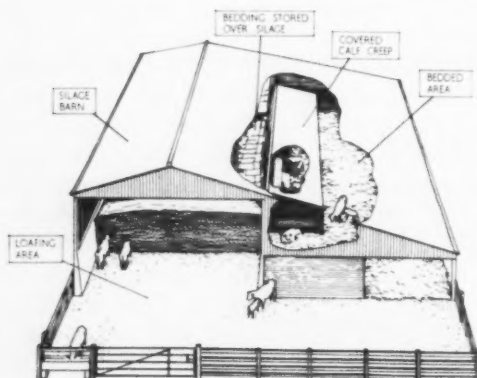
IN the counties of Breconshire and Radnorshire in mid-Wales, the practice has been to house nurse cows in traditional type cowsheds and to calve them down in the spring when they go out to grass. But now, in order to produce well-grown calves of 5-6 cwt for the autumn suckler sales, the trend is towards earlier calving, and autumn calving is also on the increase. This has raised a housing problem.

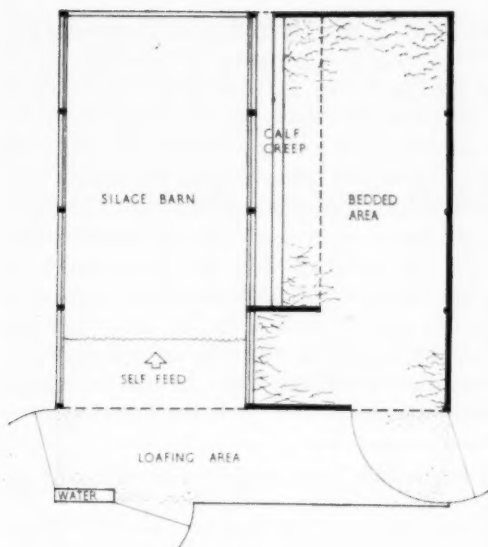
Many houses were originally designed to accommodate only the dry cows, but calving down in November or December has meant adaptations or putting up new buildings to house the calves as well. Some farmers have tried to deal with the problem by extending their cowsheds at the back of the standing. This in itself presents few constructional problems, and it is not too expensive, but it goes only part of the way.

Anyone who has tried handling about a dozen calves at a time and ensuring that each calf is sucking the right cow will understand the labour problems. It is not only a job which has to be done twice a day—it has to

be done seven days a week. And unless the work is made easier, there is a temptation for skilled stockmen to leave the farm.

Improvements in crop and animal husbandry, modern machinery and equipment have all played their part in considerably increasing stocking rates. As a result the buildings for nurse cows are now quite inadequate on many farms, and some major replanning has become necessary.





Cows and calves together

In the past the planning of buildings for beef suckling herds has revolved around the question whether the cows should be brought to the calves or the calves to the cows. In mid-Wales an answer has been found by loose housing of cows and calves together.

Experience with this system has shown that it is imperative for a calf creep to be provided, where concentrates and the best hay can be fed to the calves but is out of reach of the nurse cows. The siting of the creep is all-important; for maximum warmth it is best placed along

one of the inside walls of the buildings. The creep should have a low-level ceiling, and the space above is useful for storing fodder. A portable creep is preferable so that it can be readily removed for cleaning. Many have been constructed of home-grown timber and are proving entirely satisfactory.

It is surprising how little time the calves spend in these creeps; they obviously prefer to run with the nurse cows in the covered yard, and in fact appear to come to no harm by so doing.

The covered yard should be square rather than long and narrow, since less straw is needed for this shape. At first, extra loose boxes were provided in which the nurse cows could be calved down, but experience has shown these to be unnecessary; the cows calve down quite well in the covered yards, without interference from other animals.

As with all stock buildings, draughts must be avoided, and this means having all the openings at one end. The height should not be less than 8 ft to the eaves, and preferably 10 ft to allow for a build-up of the muck. Natural lighting should be by roof lights. The access should not be less than 8 ft wide—preferably a little larger to allow for mechanical cleaning when the cows go out to grass.

A thought for comfort

Self-feeding of silage to beef suckler herds has proved very successful. The calves seldom, if ever, travel to the silage face, where it is obviously colder and less comfortable. They are content to stay in the bedded area. It is important to site the buildings so as to avoid cold winds and obtain as much winter sun as possible, but at the same time to give shelter from the driving rain. This means facing the buildings south-east and providing an unbedded paved open yard which permits access from the covered yard to the silage face. The best position for the access to the bedded area should be as far away as possible from the silage. The nurse cows then have to walk some distance to the bedded area after leaving the silage face, where inevitably some slurry forms, thereby cleaning themselves in so doing.

There is some variance of opinion as to the correct space allowance for the nurse cows and calves, but the general consensus of opinion is that 50-60 sq. ft of covered area in the shed with, say, 20 ft of unbedded or open area per cow and calf, appears to be satisfactory. Many people strongly advocate having the whole area covered; but this is a matter for personal preference. Annual rainfall and the degree of exposure must play a big part in coming to a decision. The area within the calf creep has also been a debatable matter, but 6 sq. ft per calf seems to be working out satisfactorily.

The development of buildings for the suckling herd can be summarized in these few words—much earlier calving, greater stock numbers, avoidance of tying the stock and the erection of new buildings for the loose housing of the nurse cows and calves. But the emphasis must be on adaptability. It has taken some years to overthrow tradition, but the developments described are working out very well indeed.

L. J. Williams, F.R.I.C.S., is a Land Commissioner in the Ministry's Agricultural Land Service, specializing in farm buildings.

A Guide to Bulk Handling

BETWEEN thirty and forty per cent of the barley and wheat moved from farms in the main cereal-growing areas of the United Kingdom is now handled in bulk. This is reported in a booklet *Bulk Handling* published by the National Association of Corn and Agricultural Merchants. In some areas, and especially in the South and East Anglia, a much higher percentage of home-grown grain is now handled in this way.

Each year the proportion of grain moved in bulk is steadily rising, especially wheat for flour milling and all grains sold for feed. A survey of leading firms in the trade, carried out this year by the N.A.C.A.M. Management Advisory Service, showed that the majority of firms reporting had increased their bulk handling facilities in the past twelve months.

Development with bulk delivery of feed has been slower, except to farms operating intensive systems of production, particularly of poultry. Bulk feed probably accounts for about 20 per cent of the 4 million tons of compound poultry feeds sold in the U.K. A high proportion of the poultry feed delivered in bulk is for broilers.

The amount of cattle, calf and pig foods delivered in bulk is reported to be small, except to large-scale intensive units.

There has been some development in bulk handling of fertilizers, mainly for spreading on grassland, but the introduction of the polythene bag, which allows fertilizer to be stored safely in the open, has provided a ready alternative to bulk delivery.

The size of the bulk handling vehicles used is tending to increase. Rates of loading and discharging from bulk vehicles are also tending to rise. A few years ago a rate of 20 tons an hour was regarded as satisfactory; today, both for loading or unloading bulk vehicles, the ideal rate has risen to 35 tons an hour.

The merchant's specialized bulk handling equipment is usually expensive, and the booklet stresses the need for the right conditions at the farm and the ultimate consumer's premises for easy access for vehicles, adequate room to manoeuvre, and the correct siting of bins and silos.

The N.A.C.A.M. booklet provides a comprehensive guide to the bulk handling of grain, feeds and fertilizers, and is available from N.A.C.A.M., Cereal House, Mark Lane, London, E.C.3, price 5s. (including postage).

10. North Cornwall

L. R. Gurnett

MOST visitors entering Cornwall travel on the main A.30 road, which climbs steeply into Launceston from the Devon border. The road continues to climb intermittently until it reaches Jamaica Inn at 900 ft in the heart of Bodmin Moor. From this point, looking northwards to Boscastle and westward to the Camel estuary, is the North Cornwall district.

Cornwall is a county of contrasts, and North Cornwall in particular has extremes of climate, rainfall and scenery. Bodmin Moor itself is a granite core twelve miles across which rises to over 1,300 ft at Rough Tor and Brown Willy. Jamaica Inn is situated in the centre of the moor, and anyone who has seen it in the horizontal rain which sweeps in on high winds from the Atlantic can see the scene set for Daphne Du Maurier's novel *Jamaica Inn*.

These moors have been farmed for at least three thousand years, and the extensive villages of the hut circles of early man are dotted over the moor, usually on the southerly slopes of the tors. It was only the development of metallic tools which allowed man to penetrate the better land covered by scrub and forest.

On the granite, the soils are poor with variable amounts of peat. The indigenous sward is predominantly molinia with some nardus, fine-leaved fescue, sedges and dwarf rush. The pH is about 4.5 and the rainfall averages 70 inches. The farming is typical of livestock rearing areas. Farms are small and rely to a large extent on the open moor for summer keep, whilst the enclosed land is conserved as hay or silage for winter keep. The cattle are of Galloway type, crossed to a varying degree with the Hereford. The calves are sold at weaner calf sales in the autumn. Sheep are very variable with Blackface, Cheviot and Welsh Mountain influence.

There are two large china clay works on the moor, at Stannon and Hawks Tor, and these provide employment for many part-time farmers in the area. The clay is used for a surprising number of products including china, paper-making and cosmetics. The huge, grey triangular tips of waste material are almost entirely of granite sand which can be moulded with concrete into building blocks. These blocks are used in nearly all the modern buildings in Cornwall.

Granite is also quarried as stone for building, and the solid rock cut in blocks of the required size. Though relatively expensive, it is, of course, an enduring material which can add considerable character and strength to modern structures.

Once off the moors the soils are of good, medium loam with Devonian shale or slate as the parent material. Where this shale meets the granite there is a band of metamorphic aureole about one mile wide. The pure shale and slate soils spread from this band to the North Cornwall cliffs, from Boscastle and Tintagel to the Camel estuary at Padstow. The slate is very valuable for building, and Delabole slate quarry is renowned for the high quality of roofing slate it produces. Modern moulded concrete tiles are now cheaper, but blue slate is still in demand. Rustic slate is also extensively used to add character to modern buildings.

The soils on the Devonian shale are fairly deep and free-draining. They are naturally acid, but fortunately the Camel estuary at Padstow is silting up with calcareous sea sand which provides a very cheap source of lime.

Where the rainfall is high within a few miles of the moors, grass is by far the most important crop. The economic utilization of this grass is still the major problem of the area. Most of the farms are well under 100 acres and are producing milk. A good 50-acre farm here could carry 40 dairy cows and perhaps rear a few followers as well. With the high rainfall fairly evenly distributed throughout the year, intensive grassland techniques can give tremendous production. In most years grazing can start in mid-March, and in some years at the end of February. In the autumn grass can grow well into November, but with autumn-calving dairy herds in particular, it is difficult to utilize. However, this autumn grass is now being treated more seriously by all stockmen, and with improved management techniques, better results are being achieved. The winter can, therefore, be less than four months, but to enter the autumn with confidence feed for a full five months is needed.

North Devon beef cattle are found on the larger farms, although there is an increasing interest in dairy crosses for beef production. South Devon and Devon Longwool are the indigenous sheep and, when crossed with a Down ram, give a high quality lamb. The average wool clip from one of these ewes is about 13 lb.

In the Wadebridge area, where the rainfall is down to 40 inches, corn-growing can be treated more seriously on the larger farms. Spring barley is by far the most important cereal crop, although some winter wheat and winter barley are grown. Winter wheat can suffer very badly from black rust and occasionally very poor yields result. There is also a great difficulty in controlling weeds, particularly grass weeds, in autumn-sown cereals, as growth can continue throughout the winter. In recent years modern machinery and new varieties have enabled corn growing to penetrate further into the higher rainfall areas.

Early potatoes are an important crop to some farmers on the coast. At Boscastle, Tintagel and Polzeath they can be lifted as early as the Penzance and Pembroke crops. It has been possible to lift early potatoes and then sow barley in the same year.

The tourist industry has had an increasing effect on farming in the coastal areas. Farmhouse bed-and-breakfast signs are very common and the income can provide a very useful supplement to that of the farm. In some cases, in fact, the farm is secondary. Where quarrying is the only significant alternative to employment directly or indirectly in agriculture, development of the tourist industry must be welcomed.



Agricultural Chemicals Approval Scheme

Additions to the 1963 List

THE following additional products have been approved under the Agricultural Chemicals Approval Scheme. The Third List of Approved Products was published on 1st February, 1963.

FUNGICIDES

MERCURY—ORGANO-MERCURY COMPOUNDS

An organo-mercury compound formulated in oil specifically for the control of apple canker.

Formulations in Oil

Murphy Canker Paint (New)—Murphy Chemical Co. Ltd.

QUINTOZENE

Dusts

Botrilex—Plant Protection Ltd.

HERBICIDES

2,4-D

Amine Salt Formulations

Peaks 2,4-D A—John Peak & Co. Ltd., Newtown, Wigan (Wigan 44278)

DALAPON

Sodium Salt Formulations

J.M.S. Dalapon—J. M. Stokes Ltd.

DICHLORPROP

Liquid Formulations

Peaks 2,4-DP—John Peak & Co. Ltd.

MCPA

Potassium and Sodium Salt Formulations

Peaks MCPA—John Peak & Co. Ltd.

MECOPROP

Potassium and Sodium Salt Formulations

Peaks CMPP-K—John Peak & Co. Ltd.

2,4,5T with 2,4-D

Ester Formulations

Stancide BWK 75—S.D.C. Pesticides Ltd.

SEED DRESSINGS

THIRAM DRY SEED DRESSINGS

Fernasan S (for use as a slurry)—Plant Protection Ltd.

W. F. HOBBS

Agricultural Land Service, Huntingdon



A view of two fattening boxes showing (left) the timber door above the gate closed and (right) the door hinged back to leave the space clear above the gate

Low-cost Boxes for Fattening Pigs

MESSRS. BEDFORDIA FARMS, who farm about 1,900 acres in North and East Bedfordshire, are fattening their pigs in large boxes of novel design. Although the boxes do not accord with accepted thought on pig housing, they have proved to be very successful and reasonably priced. In addition, they have the merit of being 'dual purpose', because there is the minimum of specialist equipment in them and the roof height is sufficient to allow the buildings to be used for quick beef production.

Each fattening box is about 35 ft \times 18 ft \times 10 ft to eaves, and is constructed of 9-inch brickwork or concrete blocks, with a concrete floor and asbestos cement roof. A doorway 10 ft wide at the front of each box has a gate 3 ft high clad in galvanized steel, with a timber door above the gate. This can be closed to leave an opening 7 ft \times 3 ft or hinged back so that the whole of the 7 ft high space above the gate is clear. Permanent drinking troughs have been installed and feeding is by means of 1 ton capacity pellet feeders. The pigs are kept in deep straw, and the boxes are mucked-out mechanically after each batch has been sold. The boxes cost £370 each, excluding access roads and feeders, and it is of interest that in one, containing 121 twelve-week-old pigs, a temperature of not less than 63°F was maintained during the 1962-63 winter.

Originally introduced as converters of straw into manure to provide humus for the heavier soils, the pig enterprise has now expanded to become a very important contributor to profits, about 2,000–2,500 heavy hogs being sold annually at a live weight of about 260 lb achieved in 28–30 weeks.

Faced with several sets of old buildings, the policy has been to convert whenever possible, but new buildings have been erected where conversion was not suitable. Gilts and sows are housed on deep straw in covered yards in pens for 40, and farrowing takes place in restricted pens provided in old buildings at a conversion cost of £9 per pen. At 12 days the little pigs and sows are transferred to follow-on pens, each designed to take two sows and litters. These pens—some provided in old buildings and the remainder in new—have cost, on average, £36 each. At 7–8 weeks the young pigs are weaned and, in lots of about 120, go into the fattening boxes, built two years ago. As they grow and become overcrowded, about 30 or 40 are drawn out of each box, leaving the remainder together until they go for slaughter.

Profit on 2,400 pigs marketed in a recent 12-month period compares closely with figures put out by the nationally-known company which purchases the pigs—neither the straw nor the cost of mucking-out the yards and fattening boxes being charged, and the manure not credited to the pig enterprise. All other expenses and labour were taken into account, including day-to-day cleaning of farrowing pens, electricity, water, food at compounders' price and 20 per cent on cost of buildings.

What of the future? Mr. Ibbett, the Managing Director, is convinced that his low-cost mass production methods of pig keeping will continue to show him a profit, and is planning to treble his output. On the advice of the Agricultural Land Service, the new fattening boxes will be constructed in 11-inch cavity brickwork, with insulated roofs and with built-in hopper feeders, filled from outside the building. This, together with the rise in building prices, will increase the cost of the boxes to about £520 each but will ensure more equable temperatures and less condensation, and should show a saving in labour with rather better conversion rates.

Mr. Ibbett admires some of his pigs in a typical fattening box



IN BRIEF

A.I. for Poultry

The use of A.I. as a means of getting better results from the broad-breasted strains of turkeys having a low natural fertility has been widely accepted by the turkey industry. Now it is finding greater use in chicken breeding. It is not, of course, a panacea for reproductive problems, but under the following circumstances it can be of undoubted value.

PROGENY TESTING. Semen from one male can be used on several families of females simultaneously (75-125 fertilizations in a five-day week). Seasonal effects can thus be eliminated more surely than by shift-mating.

DEFECTIVE MATING—particularly of the very broad-breasted turkey in which the conformation is such that it may be physically impossible to complete mating. It is also of value where heavy broiler males cause damage to females while mating.

PRE-TESTING OF MALES before they are required in the breeding pen. The fertilizing capacity of semen from different males varies widely.

SHIFT-MATING OF MALES in breeding pens. The period of over-lapping of males can be considerably reduced (at least by 95 per cent) if females are inseminated on two successive days with semen from the incoming male.

SUPPLEMENT TO NATURAL MATING in turkey flocks, getting a high percentage fertility at the start of the season.

A new eight-page, illustrated leaflet (A.L.512) explaining the A.I. procedure for poultry has just been issued by the Ministry. A free copy is available from the office at Pinner.

Barley Beef over the Border

In Scotland there are at present three producer-controlled organizations specializing in the marketing of barley beef, and with such organizations it is possible to give butchers and wholesalers a regular supply of a standard article which is lean, tender and attractive to the modern housewife. I contend that only through producer groups can the whole system from the procurement of the calf to the marketing of the final product be most efficiently and economically operated. Butchers are today becoming more and more interested in the product, if only because they are guaranteed a standard article.

The scarcity of calves is at present causing concern amongst producers; however, I see no reason for pessimism; I believe that by organization and collection, and the correct incentive to the breeder, sufficient calves will be available to those who are prepared to produce barley beef efficiently.

Many farmers do not want the bother of rearing, preferring to purchase calves at 8-12 weeks old, by which time they are on to an early weaning ration. Some, on the other hand, prefer to buy the young calves and do the whole job themselves, thereby having two profits, i.e., that from rearing and from feeding. The latter has been in the past, and indeed still is, by many authorities considered to be a dangerous set up, principally because it involves purchasing large numbers of young calves. This I agree is a problem but not, as many think, an insurmountable one . . .

Some three years ago I embarked, in conjunction with my local veterinary surgeon, on a fairly large-scale calf-rearing programme. We have two farms, the calves being kept until about 16 weeks old on the one and then fattened on the other. The rearing house, measuring 35 ft by 60 ft, can house up to 85 calves at one time. The roof is insulated with polystyrene and the temperature kept constant at as near 55°F as possible. Ventilation is by extraction fans, but during warm weather these still prove inadequate and the number will have to be increased.

As far as possible calves are housed in individual pens with slatted floors; no bedding is required in summer but in the very cold part of winter calves are bedded on arrival. They remain in the individual pens for six weeks, after which they are weaned, disbudded and moved from the calf-house into a building with a slightly lower temperature and run in batches of 15-20. Here they remain until they are well settled on the barley ration, at which stage they are moved into courts at the fattening farm and run in batches of around 40-50.

In the winter the cattle are bedded on straw; in the summer when the supply is exhausted sawdust is used. As shortage of straw is a problem, we have decided to investigate the possibility of using cubicles. Slats might be an alternative, but I feel that the capital cost is too great and the building then becomes mono-purpose, whereas cubicles can be made so that they can be dismantled and stored out of the way.

Cattle are allowed approximately 10 sq. ft per head when they are introduced to the barley, increasing to about 25 sq. ft by the time they are ready for slaughter. Feeding is either in open troughs or in self-feed hoppers—whichever is more convenient. With the hoppers, 2½ in. of trough space per animal has been found sufficient.

I. A. McCrone, of McCrone Farmers Ltd., Fifeshire,
writing in *Farming Review* (Scottish Agricultural
Industries Ltd.)

Wheat Bulb Fly

Preliminary egg counts of wheat bulb fly suggest that we may expect heavy attacks by this pest next year, particularly on winter wheat grown after full fallows.

Where practicable, early sowing is the most effective way of producing a well-tillered crop in the early part of the year to stand up to attack and to yield well. We also know that wheat sown after about the middle of February will miss the attack, since in a normal season most of the eggs will have hatched by then.

Although wheat bulb fly seed dressings rarely confer much benefit on early-sown crops, these dressings can often produce nearly normal yields on crops sown in November and December, whereas untreated seed results in complete failures. Occasionally the differences between treated and untreated crops have not been so striking, but there has always been some improvement from treatment.

As a rule, up to the end of the year, the later a crop is sown the more effective is the seed dressing, though sowing should not be delayed on that account. Another factor is depth of drilling; the shallower the seed the more effective the treatment. Deep drilling should be avoided but care must be taken not to drill so shallowly that seed is exposed to birds. Seed dressings and soil insecticides generally seem to be less effective on peaty soils, and this explains some of the disappointing results in the fens.

An alternative to seed dressing, although more expensive, is to combine-drill aldrinated fertilizer (about 1 lb aldrin per acre).

Last season a number of farmers were disturbed by the apparent spread of the pest to new areas. This was not a real spread because wheat bulb fly is present to a greater or lesser extent in areas adjoining those where it is a problem. In seasons favourable for egg-laying, probably three or four times as many eggs as usual are laid, which means that in some fringe areas egg numbers will be high enough to cause damage. In a season unfavourable to the crop even moderate numbers of eggs can result in quite serious damage.

Wheat bulb fly seed dressings containing aldrin, dieldrin or heptachlor may only be used up to 31st December in areas subject to attack. For wheat sown after this date the dressings based on gamma-BHC should be used.

Grass and the Fertilizer Bag

Speaking at a farmers' conference at Bolton last month, **Mr. Harry Mudd**, Director of the N.A.A.S. Great House Experimental Husbandry Farm, touched on the use of nitrogen on fattening pastures. 'We (at Great House)', he said, 'have just completed the first year of a long-term trial to see whether it is possible to produce fat lambs from a sward to which heavy dressings of nitrogen have been applied. We put twice the number of ewes and lambs (10 ewes and 15 lambs per acre) on to fields which received four dressings of a 20 per cent nitrogen fertilizer at 5 cwt per acre at each application—400 units in all. The lambs have fattened satisfactorily and worms were no problem, for the grass was kept grazed down tightly.'

As regards phosphate and potash, Mr. Mudd drew a distinction between old meadows where FYM had been spread for many years, and pasture land. In the former the phosphate status tends to be satisfactory and the potash status low; on grazing lands the reverse tends to be the pattern. Mr. Mudd offered this advice: 'To reduce fertilizer costs I suggest we should take guidance from soil analysis; for grazing land apply lime, nitrogen and phosphate, and for mowing land, lime, nitrogen and potash.'

It is generally assumed that liming and manuring can be wasted if the grass itself is of inherently poor quality. Here Mr. Mudd said: 'I would agree that white bent, rushes and flying bent will never make good grazing, but I believe we have underestimated the value of grasses such as rough-stalked meadowgrass, agrostis and meadow foxtail. Because rough-stalked meadowgrass can grow on relatively poor soil, we have come to think that it is poor grass, but, given higher fertility, these so-called inferior strains can often produce just as much as species (e.g., ryegrass) which are normally sown.'

Here is another opportunity for reducing costs, since the establishment of a new sward is an expensive business and can seldom be achieved at less than £18-20 per acre. Provided the inferior plants such as rush and tussock grass are mown off and some weeds such as buttercup are sprayed, the improved fertility will allow better quality grasses to spread, and the types of grasses will gradually change to those normally found on better land.'

Books

Glossary of Terms Relating to Agricultural Machinery and Implements. British Standards Institution. 30s.

The purpose of this revised British Standard (B.S. 2468: 1963), as in the case of the original Standard published in 1954, is 'to standardize and co-ordinate the meaning of terms used in connection with agricultural machinery and implements'.

The original Standard included terms and definitions only and its usefulness was therefore mainly confined to persons having a reasonably good knowledge of agricultural machinery. This new edition, however, includes many more terms and definitions, and excellent line illustrations greatly enhance the value of the glossary, since component parts of machines can be more readily identified.

Manufacturers, dealers and farmers, if they adopted this standard, would speak the same language, and would undoubtedly experience less confusion in ordering and delay in obtaining spare parts.

Faced with a mammoth task, the committee responsible for this quite invaluable and essential addition to rationalization is to be congratulated on the skill and precision exercised. Glossaries are not normally compilations about which one can enthuse; they are simply essential needs. This glossary, however, not only fills the essential need but also makes fascinating reading at the same time. It merits widespread circulation. All libraries, however remotely concerned with agriculture, should possess a copy. For the agricultural student it serves to clarify a terminology which has a marked tendency to become complicated by the prevalent use of synonyms, many of which have a purely local origin and usage.

Future editions are intended to include terms appertaining to soil conservation, livestock husbandry, food processing, irrigation and transport and handling of farm produce. Here again the need for a glossary is very apparent.

H.I.M.

Farm Machinery Works Like This. S. D. KNEEBONE. Phoenix House. 10s. 6d.

This is one of a series of books with the general title 'Science Works Like This'. It will be appreciated, therefore, that it is intended more for young people who are not at present in agriculture than for those who are already engaged in the industry. Indeed, the useful last chapter, 'Jobs on the Farm', explains how a boy or girl who is interested in machinery can enter farming, and stresses the importance of learning about systems and methods of farm management.

Most of the usual machines on the farm are described; good diagrams are used and the text is written in a way likely to interest the uninitiated. Yet its phrases are accurate enough for the descriptions not to jar on a reader already familiar with the equipment being discussed.

Some thoughts on the history of the development of various machines and on the decline in the proportion of the country's population engaged in work on the land are presented attractively; a diagram emphasizes that in 1751 eight out of every ten people worked at rural crafts, whereas in 1961 the proportion was only two out of ten.

A good point is that the author implies a distinction between machines which are already developed to what appears to be the ultimate, and those which still have not yet reached the peak of efficiency of reliability for work in all conditions. Some people would disagree with his classifications, and it certainly could be argued that sugar beet harvesters have already proved so successful that it is wrong to put them into the chapter headed 'The Search for New Machinery', but it is refreshing to see the realization that improvement in agricultural machinery is still continuing. It is interesting, however, that much of the development work going on at present is connected with details of construction, rather than with the greater advances which were possible in the days when mowing machines and reaper binders were being invented.

Milking machines are treated more fully than some other equipment and some useful descriptions are given of milk coolers and homogenizers.

In a chapter on what mechanization has meant to agriculture, there are some paragraphs on the large-scale reclamation and mechanization of overseas lands. These may bring to young readers the thought that there are parts of the world where the adventure of pioneering is still to be found.

H.J.H.

An Agrarian History of Western Europe A.D. 500-1850. B. H. SLICHER VAN BATH. Edward Arnold. 40s.

It is fitting that this account of the agricultural history of Western Europe should be made available to us at a time when agriculture on the Continent is becoming of ever greater concern in this country. Mr. Slicher van Bath's book, first published in 1960, has now been translated from the Dutch by Mrs. Olive Ordish.

To provide a summary of so vast a subject was a formidable task, the more so since research is not equally advanced in the various countries concerned. Yet this is a splendid survey, and the list of sources used shows how widely the author has drawn on the available literature, notably that of Britain, the Netherlands, France, and Germany.

The author's approach is not to describe the agricultural history of each country in isolation. He recognizes that developments everywhere have followed a roughly parallel course and his chapters are written around broad themes and distinct phases which can be traced in varying degree throughout Western Europe. Thus he discusses feudalism and the manorial system in the early Middle Ages, describing the variations which developed in different regions. The great expansion of the twelfth and thirteenth centuries, the depression surrounding the plagues of the fourteenth century, the contraction of farmland in the fifteenth century, the price revolution of the sixteenth and seventeenth centuries, the advances in agricultural techniques in the eighteenth and nineteenth centuries—these and many other themes are all illustrated by evidence from different parts of Western Europe. It is especially fascinating to discover that trends well known in the agrarian history of England had their counterparts in other countries.

Throughout the book the author concentrates on the supply of, and demand for, agricultural produce, and he constantly shows how changes in population and in price levels have affected production. The technical side of farming history is not neglected, and the significance of improvements in many aspects of crop and animal husbandry is vividly illustrated by statistical material. At the end there are particularly valuable tables dealing with prices, wages, crop returns, cattle weights, and milk, butter, and cheese yields.

So great is the scope of this book that inevitably some topics are touched upon only lightly and others not at all. But a synthesis of West European agrarian history is to be warmly welcomed and there

is ample compensation for any such limitations. *K.J.A.*

Animal Husbandry. D. G. M. THOMAS and W. I. J. DAVIES. Cassell. 25s.

Dedicated to young farmers who study in the course of a working week and written largely for their requirements, this book is an interesting departure from the 'do-it-yourself' approach of many animal husbandry textbooks. The authors have attempted to describe the basic scientific principles underlying the feeding and prevention of disease in relation to the breeding cycle of cattle, sheep and pigs and to show how these principles may be applied in practice. The breeding cycle has been chosen for this purpose, as it represents the hub around which animal production revolves. In addition the genetic basis of livestock improvement has been examined.

The objectives of this book have largely been achieved, especially in the sections on reproduction, feeding and health and disease. If there are faults they are due to oversimplification. For example, in describing ruminant digestion the reader is allowed to know that digestion takes place in the fore-stomachs but not that absorption of nutrients occurs from the same site. The choice of the term foodstuffs to describe the nutrient components of feeds is a little unfortunate.

The least satisfactory section of the book is that on livestock improvement, in which the problems of selecting genetically superior parents have not been sufficiently stressed. The impact of environment on the expression of a character is not fully considered and heritability is never mentioned. Because of this no clear idea is given of the likely progress to be made when selecting for various productive characters.

The presentation of material is good and chapters have been subdivided without interfering with the ease of reading. The diagrams are generally clear, though a few are rather confusing and fail to summarize or clarify material in the text. *D.M.A.*

Weaner Pig Production. G. A. LONGBOTTOM. University of Exeter. 3s.

The author sets out to show the results of different systems of management and quality of farrowing accommodation. In a survey covering 195 herds, he compares

average litter size obtained under different systems of sow management.

Systems of management from the time of mating until the time of weaning the litter have been broken down in five combinations from 'completely indoor' to 'completely outdoor'. Sows kept entirely out of doors give the lowest number of pigs born, while those kept indoors throughout give the highest number. However, the indoor group show a greater loss between farrowing and weaning, and the average number of pigs weaned per sow per year shows no clear advantage to any system. It could not be concluded that these findings are entirely due to environment, because there was a tendency for the coloured breeds to be more represented in the outdoor systems.

Comparison has been made between food consumption under various systems and shows no advantage to any one of them.

A further survey into farrowing accommodation indicates no correlation between good accommodation based on an empirical score and average mortality rate at three weeks. It might have been interesting to assess the importance of the variables in farrowing accommodation on this problem.

F.J.F.

The Central Somerset Lowlands. G. F. C. MITCHELL. University of Bristol. 5s.

'A cursory glance at the methods of herd management of the Lowlands may give the impression of a backward system.' So says the author, but he goes on to point out just how inaccurate outward appearances can be. Mr. Mitchell's work, begun in 1958, examines the consequences of falling milk prices on farm incomes in an area which is almost entirely devoted to milk production. To this end, many of his findings will apply to other dairy farming localities, and it is to be hoped that this book will command the wide circulation that it deserves.

Right from the start it is obvious that Mr. Mitchell has been to a great deal of trouble to acquaint himself thoroughly with both the area and the farmers, and the half-dozen or so excellent photographs have captured completely the mood of the district and its problems. These problems must be unique. Fragmented holdings with up to five different landlords; inhospitable, wet, heavy, low-lying land, accessible only by unmetalled droves (lanes) which no one wants to maintain and which are impassable for five months of the year; high

rents and inadequate buildings—they must seem formidable indeed to those who are used to a more rational scheme of things.

But, despite these handicaps, the farmers of the area are second to none in their cow feeding and management, and in the past they have done well, without having to resort to the intensive enterprises which have kept many small farmers in business.

Mr. Mitchell's painstaking appraisal of both the present and the future leaves us in no doubt as to the one and only solution—improve the grass production, keep more cows and manage them better. The scope for cost reduction is small, and other 'grassland enterprises' do not compare at all favourably. To say that we have heard it all before over-simplifies the case.

This book, which, after all, costs only two gallons of milk, should be read widely by dairy farmers, even if it does encourage them to give up at the thought of competing with the low-cost producers of Somerset in the years ahead.

C.W.F.H.

English Villages. F. R. BANKS. Batsford. 25s.

This is a book for those who seek a real understanding and appreciation of English villages. Eschewing the romantic jargon that this subject seems to engender in so many writers, Mr. Banks lets the facts speak for themselves—and in his hands they speak most eloquently. He has a keen sense of beauty, whether it be in building materials, building design or village planning, and he has an eye for the kind of detail that makes for individuality. The result is a book that is as stimulating as it is informative.

Its plan is unusual. Mr. Banks first reviews the origins of the village and the various stages of its development from Anglo-Saxon times and then goes on to survey the present scene, grouping his villages in geological rather than geographical regions. His purpose, he explains, is 'topographical, not sociological', and he certainly shows very clearly how profoundly the character of villages has been influenced by their environments. Thus we are given a picture of the villager of south-west England as one who 'has cause to feel overshadowed by the landscape and may seem to have shaped his habitations to fit in with it'.

It is in building materials, the author points out, that villages of one region differ most fundamentally from those of another,

although even within limited areas, tradition, setting and individual trends in craftsmanship have produced considerable variety of pattern.

If he has a favourite region he does not name it. He is a great admirer of the Cotswolds, which, as he puts it, three generations of prosperity based on wool, combined with the existence of the finest and most natural building material, have made 'the outstanding architectural region of England'. But he finds much satisfaction, too, in the distinctive qualities of villages in other parts of the country; for instance, in the ingenious flintwork of East Anglia, the high standards of craftsmanship and variety of construction to be seen in the Weald and greensand country, and in the low unadorned buildings of the northern valleys and fells.

In a book that not merely describes villages but also explains why they have come to be where they are and what they are, there is a great deal to be said for Mr. Banks's method of grouping, though it has produced some unfamiliar divisions. For example, one of his 14 regions, the limestone country, consists of a relatively

narrow belt running from the Dorset coast to within about 25 miles of the Wash, while between this and the chalk country to the east is a shorter strip extending from Wiltshire to the south-west borders of East Anglia.

Mr. Banks writes extremely well on geology (as indeed he does on all other facets of his subject), but even so a larger and more detailed map than the one provided would have been useful.

The forty photographs by Edwin Smith are completely in tune with the text and are admirably reproduced. *A.L.M.*

Reports Received

Rural Industries Bureau Annual Report, 1962-63. 1s. 6d.

Meteorological Office Report for the year ending 31st December, 1962. H.M. Stationery Office. 5s. 6d.

National Institute for Research in Dairying Report for 1962. 7s. 6d.

ACKNOWLEDGMENT OF PHOTOGRAPHS

We gratefully acknowledge permission to use the following photographs:

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Printed in England for Her Majesty's Stationery Office
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(K109) 72-1-63-11

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Persons interested should write for an application form stating qualifications, age and experience to:

The Recruitment Officer,
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Additional information and application forms will be supplied upon request to the Secretary, Association of Commonwealth Universities (Branch Office), Marlborough House, Pall Mall, London, S.W.1.

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